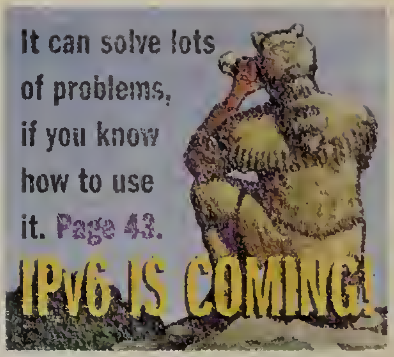
DECEMBER 16, 1996 VOLUME 13, NUMBER 51

NetworkWorld

THE NEWSWEEKLY OF ENTERPRISE NETWORK COMPUTING


It can solve lots of problems, if you know how to use it. Page 43.
IPv6 IS COMING!

Bigger than its britches?

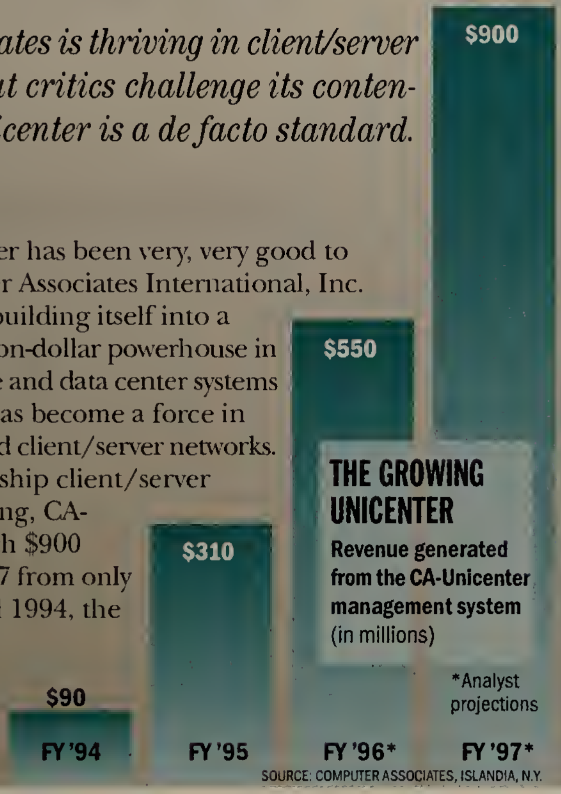
Computer Associates is thriving in client/server management, but critics challenge its contention that CA-Unicenter is a de facto standard.

By Jim Duffy
Islandia, N.Y.

Client/server has been very, very good to Computer Associates International, Inc.

After building itself into a multibillion-dollar powerhouse in mainframe and data center systems management, CA has become a force in managing distributed client/server networks. Revenue for its flagship client/server management offering, CA-Unicenter, will reach $900 million in fiscal 1997 from only $90 million in fiscal 1994, the year the product debuted.

See CA, *page 14*



THE GROWING UNICENTER

Revenue generated from the CA-Unicenter management system (in millions)

*Analyst projections

SOURCE: COMPUTER ASSOCIATES, ISLANDIA, N.Y.

Sun reaffirms Java control

By Ellen Messmer and Carol Sliwa
New York

Amid growing worries that Java could end up as splintered as Unix, Sun Microsystems, Inc. last week launched the equivalent of the Good Housekeeping Seal of Approval for Java.

Under what Sun's JavaSoft division calls the "100% Pure Java Initiative," JavaSoft early next year will start testing application and applet source code submitted by developers to determine its compliance with fundamental reference specifica-

See Java, *page 13*

(Left to right): *Apple's Andy Lauta, Netscape's Danny Shader, IBM's Patricia Sueltz, JavaSoft's Alan Baratz and Oracle's Beatriz Infante.*

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Access Network World Fusion using the number in yellow. See page 5 for details.

Cisco squeezes IBM

Widens assault on the data center with new host connectivity products and alliances.

By Michael Cooney
Raleigh, N.C.

Cisco Systems, Inc. last week announced a series of alliances and products that will not only allow the internetwork giant to put a dent in the data center door guarded by IBM, but maybe even knock it off its hinges.

Cisco's moves include agreements with two software vendors that will give customers high-throughput connectivity to SNA applications via TCP/IP links and Web browsers. The offerings will provide mixed SNA and TCP/IP environments another way to collapse parallel networks into a single switched or routed backbone.

"We want to enable a new generation of mainframe-based applications that are network-smart, while making IOS functionality pervasive from the desktop to the mainframe," said Nick Francis, director of marketing for Cisco's InterWorks Business Unit. Cisco's Internetwork Operating System (IOS) is its core routing software.

The company has been evolv-

See Cisco, *page 15*

> *"We are enabling the mainframe to be an integral part of next-generation networks."*
>
> **Nick Francis,** director of marketing for Cisco InterWorks Business Unit.

CHARLES REGISTER

Early users give NT 5.0 directory so-so reviews

By Christine Burns

Developers testing an early version of Microsoft Corp.'s Windows NT 5.0 directory said built-in interoperability with existing networks is a plus, but ties to the cumbersome NT domain scheme may do more harm than good.

Network administrators have been clamoring for an NT Server directory service that is easier to

See NT 5.0, *page 57*

There's more info online.

- Microsoft's overview of Active Directory
- Directory white papers from Microsoft and Novell

Enter the number to the right in the DocFinder box on the home page.

FIND IT ON FUSION 6530

Network World Fusion

Groupware giants jockey for Web leadership role

By Paul McNamara

Like so many stockings hung from the mantle with care, announcements by the groupware/messaging industry's top three players last week each shared a common hope: "Please, Santa, let *me* win the race to the Web."

Microsoft Corp., Lotus Development Corp. and Novell, Inc. have been writing and rewriting their Web strategies throughout the year. They've been driven by the notion that browser-based mail will soon be as indispensable as Santa's elves.

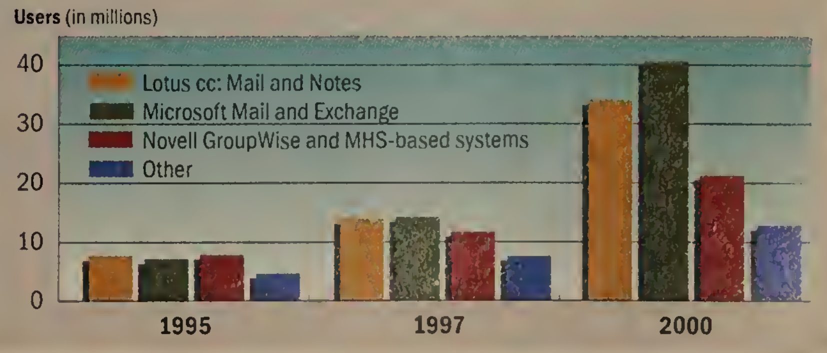
A flurry of announcements at Fall Internet World 96 reinforced this sense of urgency:

- Microsoft shelved this month's release of Exchange Server 4.5 in favor of a first-quarter 1997 release of Exchange Server 5.0, which promises to be stuffed with new Web goodies. Currently in beta, it features support for open Internet standards, including Post Office Protocol 3 and Lightweight Directory Access Protocol.
- Novell, a late entrant in the Web contest, spelled out a 12-month time frame for expanding GroupWise support for Internet technologies and standards, as well as delivering a Java-enabled version of the GroupWise WebAccess client.
- Lotus announced the shipment of Domino 4.5 server and Notes 4.5 client; an "aggressive pricing" of Domino.merchant,

See Groupware, *page 57*

IT'S A HORSE RACE

Lotus and Microsoft will gain groupware/messaging users at a faster rate than Novell, according to Boston-based market researcher Yankee Group.



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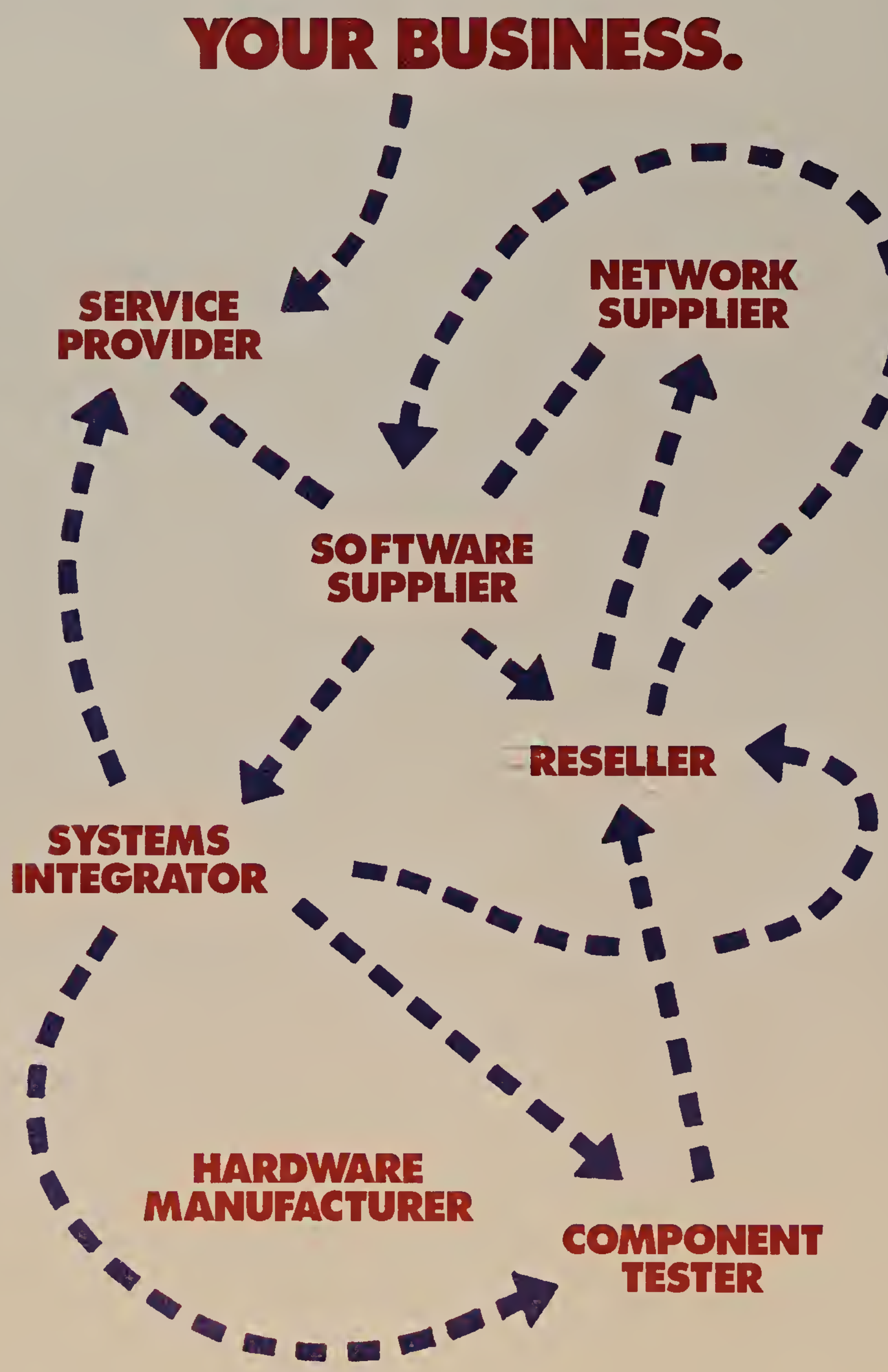

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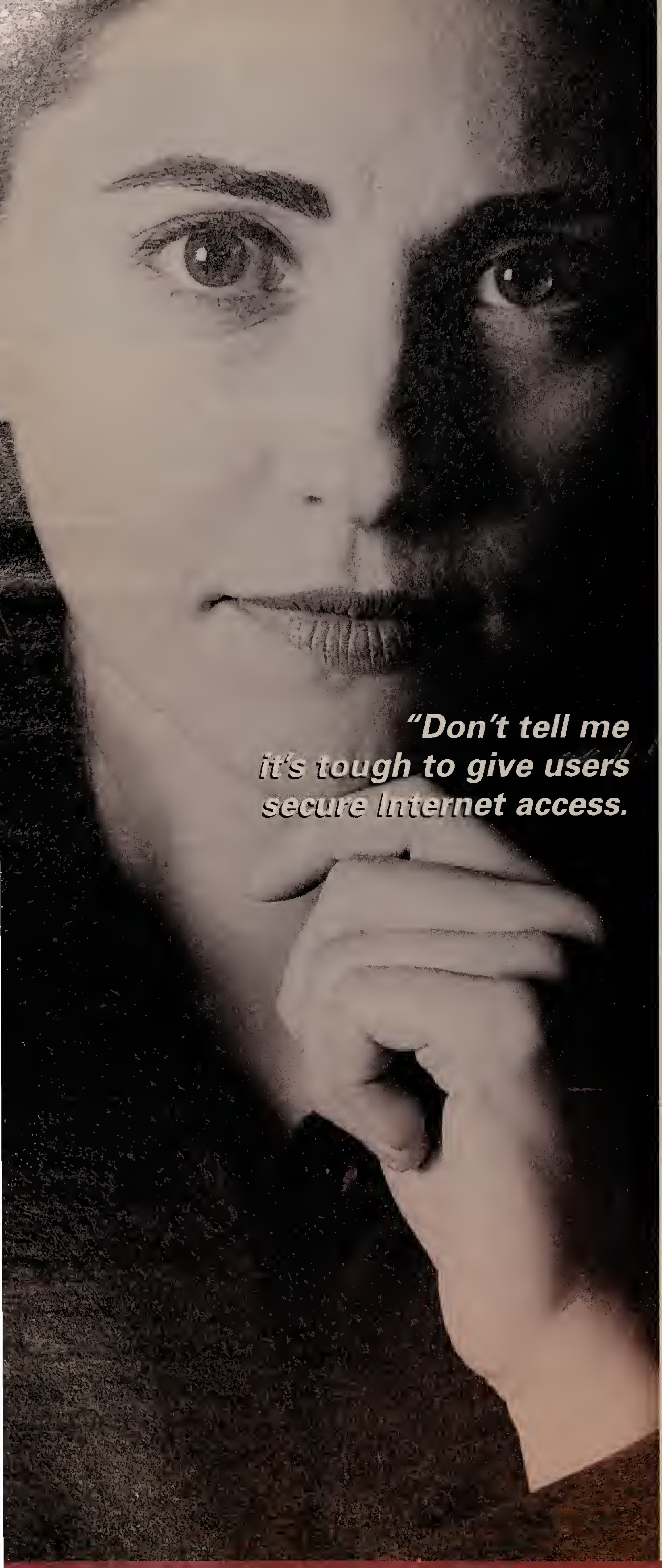

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NETBEYOND, THE EXTENDED NETWORK SYSTEM FOR SMALL AND MEDIUM-SIZED BUSINESSES.

JOHN RAE

UUNET GOES EXTRANET

CEO John Sidgmore unveils ExtraLink service at Internet World. Page 10.

DIRECT TO YOU FROM THE WEB

BackWeb Technologies gets backing for its Internet broadcast technology. Page 8.

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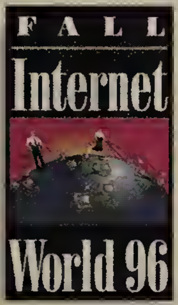

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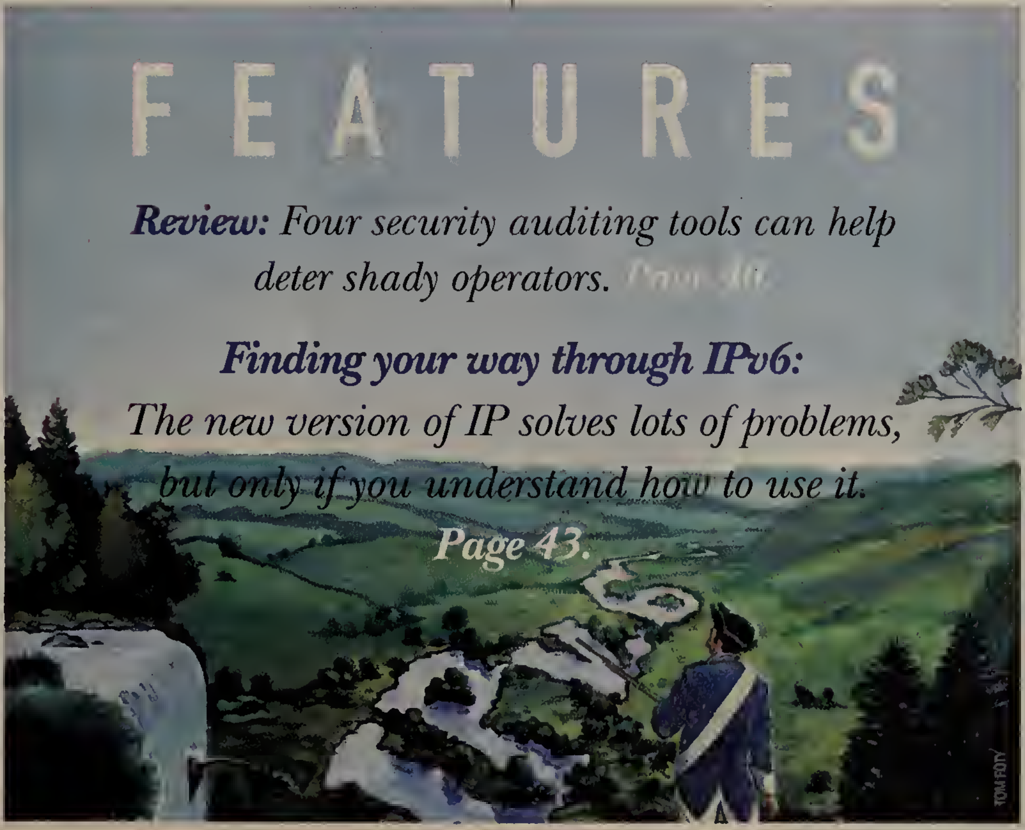

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Finding your way through IPv6: *The new version of IP solves lots of problems, but only if you understand how to use it. Page 43.*

TOM FOTY

FIND IT ON FUSION

To quickly get to any online info referenced in *Network World*, type its DocFinder number in the input box on the home page.

This Week

Only on Fusion

Take an Internet whirl with our comprehensive coverage of last week's breaking 'Net news.

- Genuity, a Phoenix-based ISP, has set up a nonprofit network access point (NAP). The company says it'll quickly recoup the expensive start-up costs by reducing its long-distance charges for dialing in to other NAPs. Read papers on how NAPs work. **DocFinder: 6535**
- John Sidgmore, CEO of UUNET Technologies, predicts most ISPs will soon disappear under the brunt of competition from carriers, such as the one that now owns his company. **DocFinder: 6536**
- A complete roundup of the week's other announcements, including those from Compaq and Oracle. **DocFinder: 6539**
- Use **DocFinder 6531** to bring up links to all of our Fall Internet World 96 coverage.

News+

- **Messaging:** Come online to download demos of new messaging applications from Microsoft, Lotus and Novell. **DocFinder: 6533**
- **Host connectivity:** As Cisco tries to break IBM's lock on the data center, check out white papers on the SNA and TCP/IP technologies it's licensing. **DocFinder: 6534**

NetRef

- **IPv6:** Delve as deeply as you want into the next-generation IP, with a collection of RFCs and papers on IPv6. **DocFinder: 5401**

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News briefs, December 16, 1996

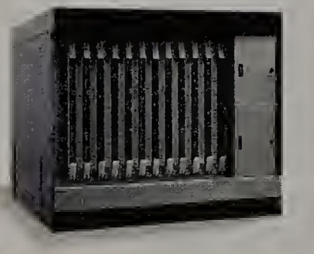
Microsoft agents no longer secret

■ Microsoft Corp. last week at Fall Internet World 96 was talking up a software agent technology called Sidewalk, which gleans information from both Internet Web pages and communities of users with shared interests. The company expects to have a prototype of Sidewalk out by next month, said Edward Jung, division architect in Microsoft's advanced technology division. Some pieces of it will appear in Microsoft's Office 97 next year, he said. For the complete story, link to Network World Fusion (www.nwfusion.com) and enter 6540 in the DocFinder box on the home page.

WorldCom pumps up

■ On the eve of completing its merger with MFS Communications Company, Inc., LDDS WorldCom is beefing up its net with ATM switches that promise to offer better throughput for the long-haul carrier's data customers. In addition, the purchase of 27 Cascade Communications Corp. CBX 500 ATM switches and 18 Cisco Systems, Inc. BPX ATM switches sets the stage for new services, including T-1 ATM and frame relay-to-ATM service interworking. The company would not say when those services will be offered.

NET performs ISDN magic



■ Network Equipment Technologies, Inc. (NET) last week introduced a way for private T-1 network customers to run videoconferences on demand using reliable and relatively inexpensive ISDN-based equipment. With PrimeVideo, a hardware module for NET's flagship line of IDNX bandwidth managers, customers can set up videoconferences without using expensive technologies, such as ATM, or having to rely on carriers to set up ISDN links. For the complete story, link to Network World Fusion (www.nwfusion.com) and enter 6538 in the DocFinder box on the home page.

Microsoft goes shopping

■ Microsoft Corp. last week said it is acquiring NetCarta Corp., which makes the WebMapper Web site management tool, for about $20 million. Microsoft plans to bundle WebMapper into its BackOffice application suite.

Bells go surfing with Netscape

■ Five local exchange carriers are teaming with Netscape Communications Corp. to get their Internet service message out to as many potential customers as possible. Ameritech Interactive Media Services, Bell Atlantic Internet Solutions, BellSouth.net, Pacific Bell Internet Services and Southwestern Bell Internet Services last week said they will use Netscape Navigator as the default browser for their Internet services. Netscape will also offer users ISP Select, let them select an ISP and establish an account with that provider through Netscape's Internet site.

IBM finds key to security

■ IBM last week unveiled a technology called the IBM SecureWay Key Management Framework, an API that provides an interoperable method for recovering scrambled data. Northern Telecom, Inc., RSA Data Security, Inc. and Trusted Information Systems, Inc. pledged support for the technology.

Novell's NT story

■ Novell, Inc. is poised to release the first piece of its Novell Directory Services (NDS) for Windows NT Server into open beta next month. Company officials had originally planned to generally release Tabasco, its tool for managing Windows NT users though NDS, to customers by year-end. But Damon Darais, Novell product-line manager, said delivery has slipped into the first quarter of 1997 to add stronger security features and tools for migrating NT users into NDS en masse rather than individually.

3Com merges token-ring, Fast Ethernet networks

By Jodi Cohen

Token-ring switch customers are not used to having a lot of options, especially when it comes to high-speed connectivity.

But last week 3Com Corp. changed that by unveiling technology that embeds token-ring frames in Fast Ethernet traffic flows, allowing customers to provide token-ring clients with 100M bit/sec Ethernet server and backbone links.

Previously, token-ring users had to settle for 16M bit/sec server connections or choose from expensive fast LAN technologies such as FDDI and ATM. But 3Com's Fast Ethernet offering costs about one-third as much per server connection as the other two high-speed options, said Ed Harper, product-line manager within 3Com's systems division.

A typical network using the Token Ring-in-Fast Ethernet technology would consist of 3Com token-ring switches equipped with new one-port Fast Ethernet modules that let the token-ring ports talk to a Fast Ethernet switch. Token-ring users could then access servers attached to the Fast Ethernet switch.

The new module does not translate between token-ring and Fast Ethernet frames because that would have a negative effect on performance, Harper said. Instead, the module puts Fast Ethernet headers and trailers on token-ring frames, disguising them as Fast Ethernet packets.

Cabletron's *ATX LAN backbone switch — which Cabletron acquired from SMC — supports Ethernet, token-ring, FDDI, Fast Ethernet and ATM links.*

The technology will allow International Flavors & Fragrances, Inc. in New York to throw out expensive routers, instead linking token-ring LANs with Fast Ethernet switches.

"This could help me save about $30,000 to $40,000 per building," said Rich Whittemore, the company's product manager of communications and distributed systems. "And we have six buildings in just one of our campuses, so the numbers become substantial."

The module supporting Token Ring-in-Fast Ethernet will ship in the second quarter of 1997 for $1,500.

Taking aim with token ring

Separately, Cabletron Systems, Inc. last week enhanced its ATX LAN switch with a token-ring module priced 20% lower than the company's existing module.

Like its predecessor, the module has four switched token-ring ports and provides source routing, transparent and source routing transparent support. What differentiates the new module — other than the price — is its support for dedicated token ring (DTR).

DTR doubles the speed on each token-ring switch port, enabling each 16M bit/sec port to operate at 32M bit/sec.

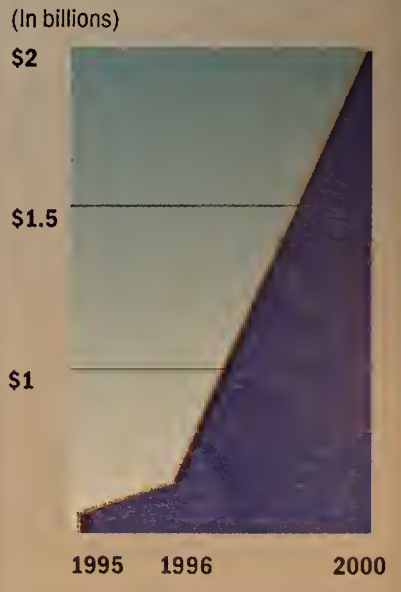
That gives users much-needed high-speed server links, analysts said.

The module is priced at $6,995, as opposed to the previous version, which sold for $8,995. The device will ship in the first quarter of 1997.

©3Com: (408) 764-5000; Cabletron: (603) 332-9400.

TOKEN-RING SWITCHING TAKES OFF

Worldwide token-ring switch revenue



SOURCE: DELL'ORO GROUP, PORTOLA VALLEY, CALIF.

FORE buys its way into Gigabit Ethernet market

By Jodi Cohen

Pittsburgh

If you're going to compete in the LAN infrastructure market, you need a Gigabit Ethernet story. Just ask FORE Systems, Inc.

PROFILE: SCALABLE NETWORKS

Based:	Pittsburgh
Founded:	January 1995
Employees:	9
Key technologies:	Gigabit Ethernet and a scalable switch architecture that supports up to 40G bit/sec. First products will be announced next year.

The ATM pioneer last week acquired Gigabit Ethernet start-up Scalable Networks, Inc. for about $35 million in stock, sending one of the strongest signals yet that vendors must support both ATM and Gigabit Ethernet to meet customers' high-speed network needs.

The deal provides FORE with Gigabit Ethernet technology, along with a modular device that will support up to 40G bit/sec of switching capacity and thousands of ports. The switch could ship as early as the third quarter of 1997.

FORE will likely target Gigabit Ethernet for server connections while continuing to pitch ATM as the LAN backbone technology of choice, analysts said.

Just like FORE, Scalable Networks was founded by folks from Carnegie Mellon University and is also based here. This made the little-known start-up particularly attractive to FORE.

While few industry observers were surprised by FORE's move to acquire a Gigabit Ethernet player — FORE joined the Gigabit Ethernet Alliance in September — many were shocked at the price of the deal.

FORE paid about six times less for Scalable Networks than Cisco Systems, Inc. did for Gigabit Ethernet start-up Granite Systems, Inc., said Skip MacAskill, senior research analyst at Gartner Group, Inc., a consultancy based in Stamford, Conn. "And it looks like FORE is even going to have a product out a couple of quarters before Cisco, so maybe they got themselves a bargain," he said. ■

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'NET BUZZ

The latest on the Internet/intranet industry.

By Chris Nerney

CEO WANTED . . . AGAIN Just six weeks ago, Internet micropayment software start-up **Clickshare Corp.** was set to announce the appointment of a new chief executive officer. Chosen after a nationwide search, the unidentified CEO was said to be a successful Internet entrepreneur whose track record would draw much-needed venture capital for the 1-year-old Williamstown, Mass., company.

But the new CEO never joined Clickshare, and several executives and board members – including two cofounders – departed earlier this month. Former Marketing Director **Felix Kramer** blames the exodus on Clickshare cofounder and majority stockholder **William Densmore.**

In a message temporarily linked last week from Clickshare's Web page, Kramer, who also resigned as a board member, said Densmore "was so unwilling to relinquish control that everyone else eventually left."

Densmore, for his part, calls the departures a common course of business for fledgling high-tech companies.

Clickshare, which sells software allowing Web sites to track and charge users on a per-click basis, has generated lots of trade press coverage and interest at venture capital beauty pageants for Internet companies.

This attention, however, has not translated into financing because venture capitalists have been leery of Clickshare's inexperienced management team.

Densmore admits recent events won't exactly dazzle the venture community, and he acknowledges the company "waited too long to get money and management."

Apparently, it will have to wait a bit longer. In the meantime, Clickshare has resumed its CEO search and was due to name a new board last Friday.

NO SUCH PROBLEMS HERE **BackWeb Technologies** has bagged $13 million in equity financing from a group of investors. The San Jose, Calif., firm — founded in 1995 by Israel-based Internet software company BRM Technologies, Ltd. — develops and markets personalized broadcasting software for the Internet.

The funding comes on top of $4.5 million in previous financing. The lead investor in the latest round is Goldman Sachs affiliate **Capital Partners II.**

Also attracting recent venture capital funding is **Net Perceptions, Inc.**, a developer of tools for helping Web sites target content to consumers. Based in Eden Prairie, Minn., the company received $4 million in second-round financing. **Vulcan Ventures, Inc.**, Microsoft cofounder **Paul Allen's** investment group, was the lead investor.

THE PARALLELS ARE CHILLING Ten years ago, **Network World** was launched. Ten years ago, **Mike Kaul** joined **Oracle Corp.**

Last month, 'Net Buzz made its debut. Last week, Kaul left his vice president's post at Oracle to become chief executive officer of Pittsburgh-based **Empirical Media Corp.**, which will soon release WiseWire, a Web information filter that uses intelligent software agent technology.

Coincidence, you say? If that's what you choose to believe, who are we to wrench you from your little fantasy world?

Unlike that wealthy dabbler Paul Allen, 'Net Buzz doesn't have the money to throw at every Internet start-up that comes to us, hat in hand. We have to work for a living, so you can help by throwing us your best information about Internet and intranet companies, products and players. Contact Chris Nerney at cnerney@nww.com or (508) 820-7451.

FCC expected to consider access fees for ISPs

By David Rohde
Washington, D.C.

By Christmas, the Federal Communications Commission is expected to publicly broach the idea of forcing Internet service providers to pay access fees to local telephone companies.

But the consensus among Washington insiders is that the FCC probably will not make ISPs pay access fees anytime soon.

The FCC will only impose fees on ISPs once rates for long-haul carriers are reduced, and that could take several years, analysts said.

The FCC's proposal to overhaul access fees is one of several rulings that are required by Congress to clean up the telephone industry's convoluted method of subsidizing universal local telephone service.

Long-distance carriers are calling for a dramatic reduction in the average 3 cents per minute that regional Bell operating companies earn on each end for completing a switched voice or data connection. Long-distance carriers say they must pass these costs on to customers.

But most RBOCs are resisting any reduction and demanding that long-haul carriers as well as ISPs pay an access fee, figuring that most Internet traffic is long distance in nature. ISPs and other enhanced service providers — those manipulating data rather than merely transporting it — have been exempt from access charges since the 1984 Bell system breakup.

Analysts believe the FCC will propose that RBOCs — over an extended period of time — reduce access fees to the less than 1 cent per minute it costs to provide access. The FCC will only impose fees on ISPs once rates for long-haul carriers are reduced, and that could take several years, analysts said.

"We agree that the ISPs should pay only the economic cost on a per-minute rate," said Frank Gumper, vice president of federal regulatory planning for NYNEX Corp.

REALITY CHECK

How much long-distance carriers pay for local access: 6 cents per minute to originate and complete a call.

How much it costs RBOCs to provide access: 0.4 cents per minute to originate and complete a call.

Numbers vary by RBOC and state. These are averages.

SOURCE: MCI, WASHINGTON, O.C.

"We have not taken the position that they should pay 3 cents a minute," he said.

But he said the FCC must eventually impose an access charge on ISPs because Internet users on flat-rate plans frequently have no incentive to monitor their usage and, as a result, tie up too many lines. ■

MCI to deliver on managed FRAD service promise

By Denise Pappalardo
Atlanta

After announcing a managed frame relay service for the second time, MCI Telecommunications Corp. told its customers last week the service will finally roll out by the end of next month.

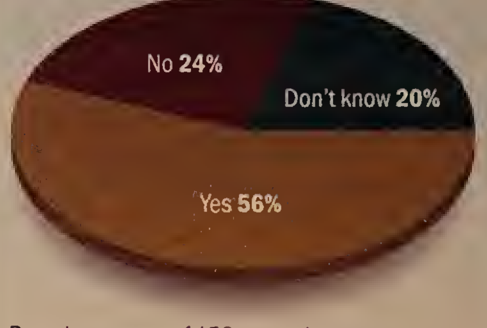
MCI's Enterprise WAN Managed Frame Relay Service is aimed at network managers who want to save money by moving SNA traffic from private lines to frame relay but are leery of taking on that migration task alone.

Under the service, MCI will set up and manage the frame relay network. In addition, through a partnership with MCI, Sync Research, Inc. will provide its FrameNote frame relay access devices (FRAD) as part of the package. MCI will manage the Sync FRAD at the customer site using Concord Communications, Inc. management tools.

Sync has worked with Sprint Corp. to provide gear for its managed FRAD service since October 1995. MCI introduced its managed FRAD service last January, along with a native-mode Synchronous Data Link Control service it has yet to deliver.

MCI attributes the delays in delivering its managed frame service to software slowdowns from Bay Networks, Inc., a primary provider of equipment used in MCI's frame relay network. The two firms are now working out integration issues between Bay's software and MCI's network management systems, said Stephen Von Rump, vice president of marketing for MCI's Data Services Division.

WILL YOU CONSIDER MANAGED FRAD SERVICES?



Based on survey of 150 network managers.

SOURCE: FRAME RELAY SYSTEMS & TECHNOLOGY, CHEVY CHASE, MO., AND SAGE RESEARCH, NATICK, MASS.

Although Von Rump recognized that the delay may have cost MCI some "early adopters," he said that SNA customers are only now beginning their network migration in earnest. Market research firm Dataquest, Inc. backed up his assertion in a recent report showing that SNA accounts for less than 5% of all frame relay traffic, even though it makes up 60% of all data riding over WANs.

Lower service costs and maturing frame relay networks are fueling interest in SNA-over-frame services, said Paul Wickre, president at Frame Relay Systems & Technology, Inc., a Chevy Chase, Md.-based consultancy. But it's a "tremendous pain" for network managers to migrate SNA traffic onto a frame relay WAN themselves, he said.

"Most companies simply do not have the staff with the knowledge base necessary to integrate their legacy networks on to a frame network," he added.

Two MCI customers — Citizens National Bank of Henderson, Texas, and another unnamed user — are beta-testing the service. MCI indicated it will also roll out a managed Switched Multimegabit Data Service, but did not offer details. Pricing on MCI's Managed FRAD service was not available.

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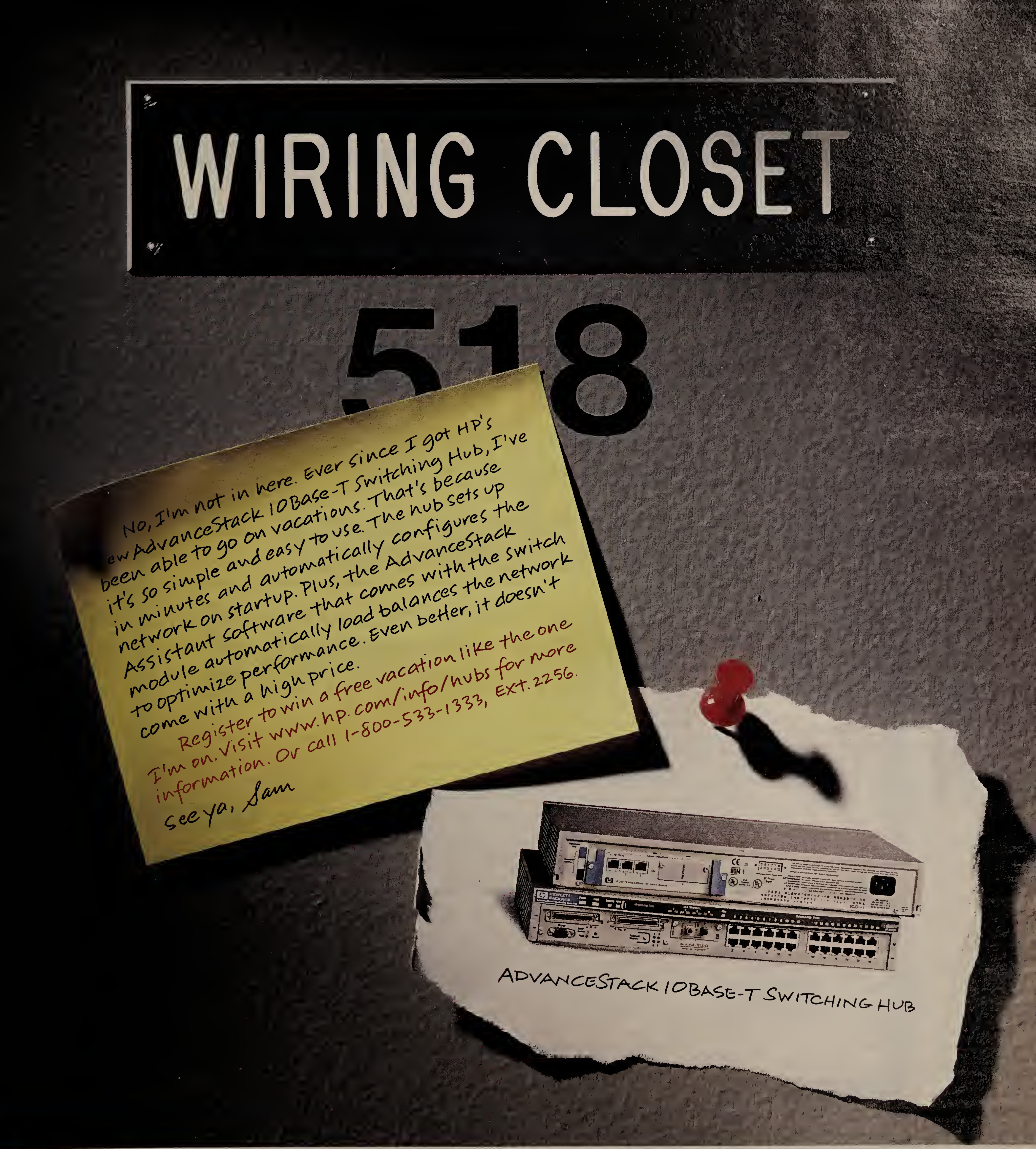

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MFS gives ISDN a DSL twist

By Denise Pappalardo
Omaha, Neb.

MFS Communications Company, Inc. is offering a new Internet access service that may kill two birds with one stone: It will give customers a dedicated high-speed connection into the 'Net while alleviating some of the Internet-related congestion on voice networks today.

MFS is planning to offer ISDN access to the Internet using Ascend Communications, Inc.'s Max communications server and its new ISDN Digital Subscriber Line (IDSL) card. IDSL lets users' Internet calls bypass central office (CO) switches and connect directly to MFS subsidiary UUNET Technologies, Inc.'s frame relay network for Internet access.

MFS' Vidal *says there's no reason why Internet-bound ISDN traffic needs to go through a voice switch.*

While MFS has committed to deploying Ascend Communications, Inc. equipment to support its new service, it will also trial General DataComm, Inc.'s Colossus, a DSL system, for a possible two-vendor solution.

That will relieve some of the pressure on carrier voice switches and help customers who may have had calls dropped or experienced busy signals because growing Internet traffic is eating up capacity.

"This service looks, feels and tastes like ISDN; it's only different at the CO," said Daniel Briere, president of TeleChoice, Inc., a Verona, N.J.-based consultancy.

When users connect to the Internet using an analog dial-up service or ISDN, they always dial the same number, according to Ronald Vidal, vice president of new ventures at MFS.

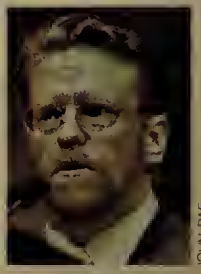
Vidal said there is no reason these connections need to go through the voice switch when the traffic is heading toward the Internet.

MFS also plans to roll out an HDSL-based Internet access service at 768K bit/sec access speed, with availability by the end of the first quarter. Users will have to upgrade customer premises equipment with an Ethernet interface card. ■

UUNET's ExtraLink details hit the street

As expected, UUNET Technologies, Inc. Chief Executive Officer John Sidgmore officially unveiled the company's ExtraLink service last week during his keynote speech at the Internet World show.

ExtraLink is designed to help companies open up their corporate intranets to business partners in a secure way. The Fairfax, Va.-based Internet service provider is supporting its ExtraLink service using proprietary software that will reside at the customer's site. UUNET is also using encryption servers that are based on Digital Encryption Standard technology from Cisco Systems, Inc. to ensure the safe transfer of information between multiple sites.


JOHN RAE

"Extranets *need to offer security, reliability and quality of service," Sidgmore says.*

Users can choose dedicated ExtraLink or dial-up ExtraLink Remote services. UUNET supports CheckPoint Software Technologies, Inc. and Raptor Systems, Inc. client security platforms for its remote service.

"Extranets need to offer security, reliability and quality of service," Sidgmore said. Because UUNET is now owned by MFS Communications Company, Inc., it is in a unique position to offer users quality-of-service guarantees that cover both network performance and availability, he said.

UUNET will offer 99.9% guarantees on bandwidth, access and route availability, according to Alan Taffel, vice president of marketing and business development at the company.

UUNET is testing the service now with a few of its customers and will most likely have a full commercial rollout after February, when testing is slated to end. ExtraLink dedicated service will range in price from $1,700 per month for a T-1 connection to $18,900 for a T-3 link. ExtraLink Remote will be priced at $3 an hour with a $1,000 per month minimum.

Advertisement

PNNI: A Not-So-Private Protocol

By Ted Tedijanto
Lead Software Development Engineer

The ATM Forum Private Network-Network Interface Specification version 1.0 (PNNI) is one of the keys to building large, multivendor networks.

PNNI specifies both routing and signalling protocols. Prior to PNNI, the only way to build an ATM network of multivendor switches was to use the Interim Inter-switch Signalling Protocol (IISP). IISP allows connections to be established among multivendor switches. However, since IISP does not include any routing protocol, manual configuration of static routes—a painstaking process, especially for large networks—is necessary. PNNI addresses this issue and provides robustness, quality of service (QoS) support, and scalability.

The routing protocol of PNNI determines routes across the network. Based on the well-known link-state protocol, it provides dynamic topology discovery and a reliable mechanism for distributing topology and reachability information. Network topology information consists of nodes and links and includes the necessary metrics and attributes to facilitate QoS support and optimal route computation. Reachability information consists of the address prefixes of end systems reachable from each network node.

PNNI routing also minimizes the amount of topology and reachability information through a technique called hierarchical routing. Using hierarchical routing, switches are grouped into peergroups. Switches within a peergroup exchange detailed topology and reachability information; however, only summarized information is available to switches outside the peergroup, in which case, a peergroup appears as a logical node. Logical nodes form the higher-level topology. They, in turn, can be grouped into higher-level peergroups, and so on.

PNNI is one of the Anchorage Accord foundation specifications and is designed to easily support future extensions. In addition to security, support for leaf-initiated join, and policy-based routing, other features targeted specifically for carrier networks are now being developed.

ATM™ ISSUES ANSWERS

FORE is a major contributor to the ATM Forum's PNNI subworking group. Our experience with implementing scalable ATM routing protocols has enabled our customers to build the largest ATM networks currently in operation. These networks have used a pre-standard version of PNNI since June 1995. Soon, products implementing the ATM Forum PNNI will be rolled out. FORE's PNNI 1.0 implementation is backward-compatible with the pre-standard version.

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Circle Reader Service #11

Novell beefs up IntranetWare package

Company speeds things up with a revised Web Server and security services.

By Christine Burns
New York

Novell, Inc. last week took steps to give customers of IntranetWare faster, easier and more secure access to Internet resources.

Enhancements to the package, which already features tools for setting up an intranet based on NetWare 4.11, include a faster Web server, better security and a new proxy caching capability.

Novell is not covering new ground with these additions, but is matching what competitors already offer, said Rob Enderle, an analyst with Giga Information Group in Santa Clara, Calif.

The Novell Web Server 3.0 — slated for open beta today — is twice as fast as its predecessor. Novell officials said it handles more than 600 connections per second.

Version 3.0 also now supports Secure Sockets Layer 3.0, which encrypts all communications between standard Web browsers and Novell's Web Server.

For easier management, Novell has added virtual directory capabilities to the server.

This allows Web pages to reside on any NetWare server, reducing the need for managing multiple Web servers. Novell Directory Services provides automatic ties between the Web server and the distributed Web pages.

Other features include:

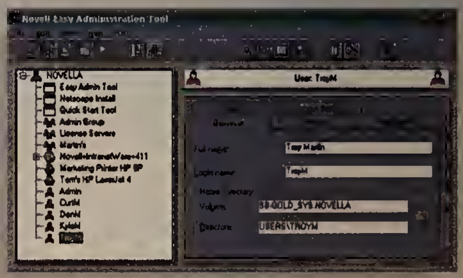
- The ability for Web applications to tap into Oracle Corp. databases.
- A search engine that indexes 20 types of files.
- Multihoming, which allows companies to host multiple Web sites on a single server.

Web Server 3.0 beta can be downloaded from Novell's Web site (www.support.novell.com/home/pubbeta/nws).

As part of its Early Access Program, Novell also announced availability of early code for its IntranetWare border services. These include proxy caching for quicker end-user access to common Web data, enhanced security services for blocking the flow of unwanted information and the ability to establish virtual private network connections.

These technologies are expected to ship next year as part of IntranetWare. Currently, they are accessible via the Web (www.novell.com.ear). ■

Novell courts small business with Kayak



Novell last week sent Kayak, its NetWare 4.X-based operating system designed for use in companies with 25 or less users, into final beta. The product comprises a single-site directory service, Netscape Navigator 3.0, and Novell Web Server 2.5 and ManageWise-based management tools.

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Circle Reader Service #7

Vendors put on a show at Internet World

By Ellen Messmer
and Carol Sliwa
New York

If Netscape Communications Corp. wanted to catch a glimpse of rival Microsoft Corp.'s new products at Fall Internet World 96, it needed to look no farther than the booth next door.

Microsoft staffers were demonstrating their wares on a stage that faced Netscape's crammed quarters. Among the new Microsoft products on display were:

- The final shipping version of Internet Information Server 3.0, featuring Active Server Pages for server-side application development; an index server for full-text searches; and the NetShow multimedia server.
- Transaction Server 1.0, formerly codenamed Viper, which Microsoft brought to market last week ahead of schedule. Promotional pricing for the transaction processing software will be $2,000 per server.
- Visual InterDev, formerly Internet Studio, the company's tool for building Active Server Web applications. New features include the FrontPage Web page editor, a data form wizard and a source control system.

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The Redmond, Wash., software giant also touted two partnerships it thinks will help vault it to Internet dominance.

USWeb Corp., which operates a franchise of Web professional services firms across the country, will push Active Platform technology in seminars and sell ActiveX products.

Separately, PointCast, Inc. will push news and information updates to desktops equipped with Microsoft's Internet Explorer 4.0 Web browser. In a blow to Netscape, PointCast also pledged to distribute Microsoft's Internet Explorer as its preferred browser.

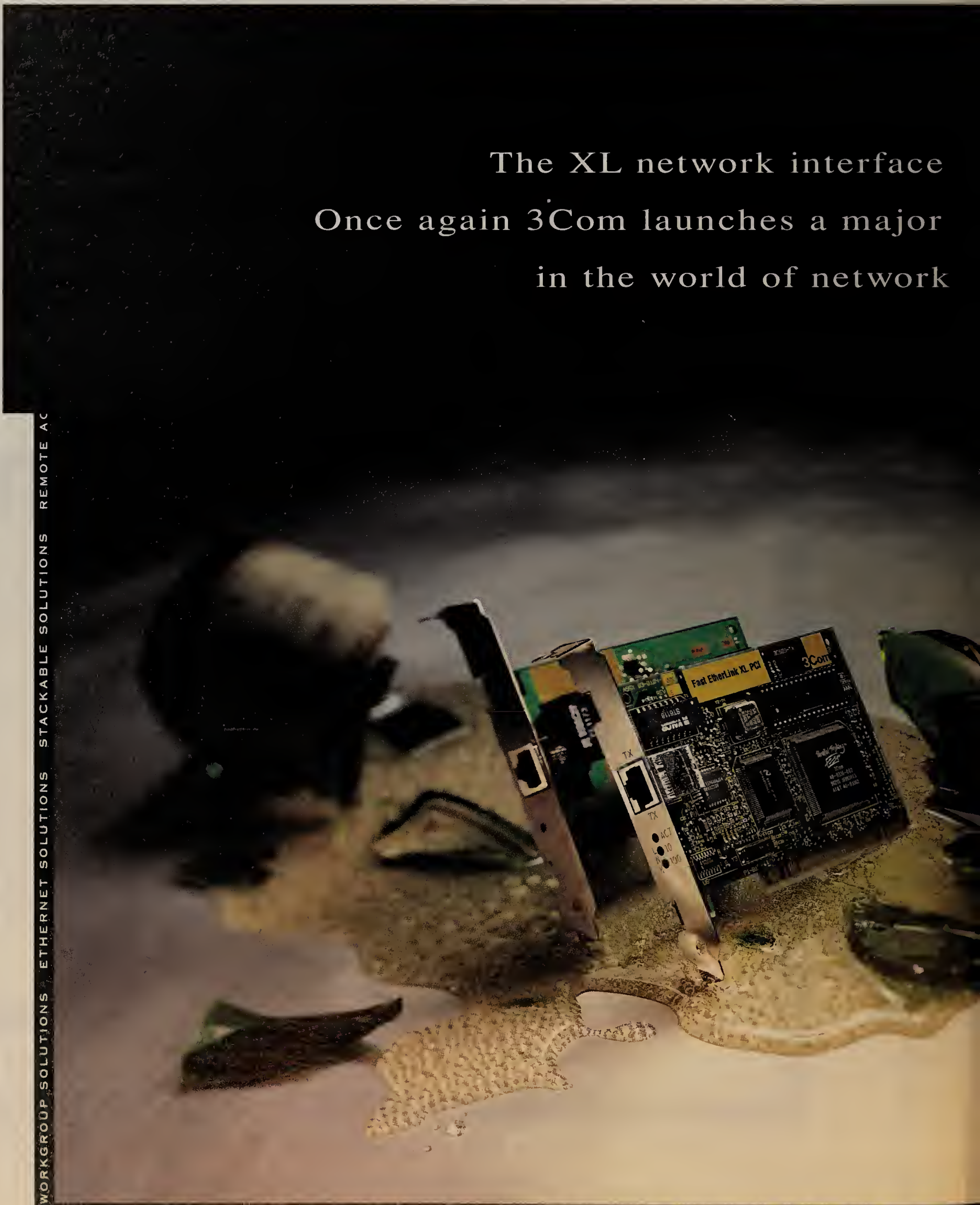
Netscape last week was busy talking up development tools. The Mountain View, Calif., software company announced it would endorse and resell tool kits from NetDynamics, Inc. NetObjects, Inc. and Symantec Corp. that it promised will work well with its Open Network Environment. The SuiteTools also include Netscape's LiveWire Pro. The products, expected to be available in the first quarter of 1997, will be sold individually.

Not surprisingly, Java was another hot topic at the show.

Oracle Corp. unveiled plans for making Java a key part of its distributed computing architecture. Under the plan, Java will be not only an application programming language, but a language for programming the Oracle database. The company will also support other Java technologies to provide access to back-end databases.

That combination is designed to move Java from its current focus on client Web applications into large-scale, database applications.

Separately, Symantec unveiled Visual Cafe, a visual rapid-application development product for producing trusted Java applets. The product will start shipping this week, said Roger Bowman, development relations product manager at Symantec. ■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Java

Continued from page 1

tions in the Java Developers Kit (JDK).

Developers, the main users of Java today, complain that Java code runs differently across browsers from Netscape Communications Corp. and Microsoft Corp., which have both made extensions to the basic JDK (*NW*, Dec. 9, page 1).

Netscape last week signaled its intent to stick more closely to the original specification by rallying around 100% Pure Java with Oracle Corp., IBM and about 100 smaller Java developers at a hastily arranged press conference at Fall Internet World 96.

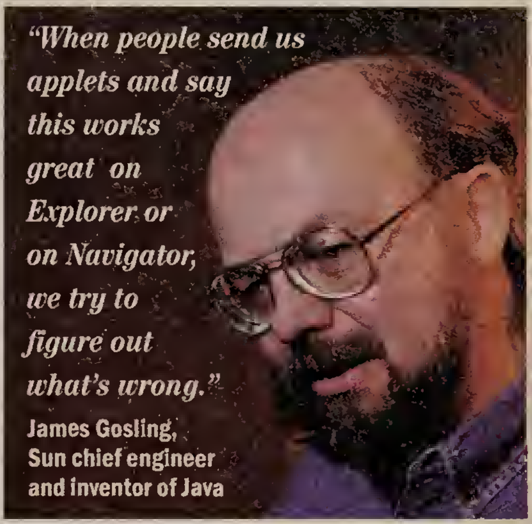
Microsoft, later claiming it had not been notified in time, did not participate and, more importantly, declined to support the initiative right away.

"If you really want to make Java 100% pure and have it be an open language, then put it into a standards committee," said Brad Chase, vice president for marketing at Microsoft's Internet client and collaboration division, who added that Microsoft is taking that route with its ActiveX technology.

Sources at Sun said they have considered that idea, but it is still too early to take that step. "We're totally committed to Java," Microsoft's Chase continued. "No one should be confused about that. We let people do cross-platform Java applications. We let people have Java applets talking to ActiveX, so we're broadening the possibilities of Java like no one else."

"Microsoft is seemingly trying to pull things in a proprietary direction," said Danny Shader, Netscape vice president of industry and developer relations. At Sun, there is clearly worry that Microsoft will undermine Java with extensions. "They could hijack it," said one SunSoft source.

James Gosling, Sun chief engineer and the inventor of Java, last week said Sun is aware that arch rivals Microsoft and Netscape "have done things outside" the spec, adding that Sun "hammers on them regularly when people find the bugs."



"When people send us applets and say this works great on Explorer or on Navigator, we try to figure out what's wrong."

James Gosling, Sun chief engineer and inventor of Java

It is incumbent upon licensees like Netscape and Microsoft to ensure products adhere to conformance tests that are part of the JDK. Licensees self-test their code and place a certification stamp on it. JavaSoft has shied away from trying to play an enforcement role so far.

JDK 1.0 had 50 tests; JDK 1.1 out last week has 5,000, and that number may grow to 7,000, Gosling said. Sun hopes the added tests will deter proprietary extensions. Microsoft said it has not decided whether it will support JDK 1.1 in its products, while Netscape has said it will.

Alan Baratz, JavaSoft president, said Java applications will be able to carry the "100% Pure Java" brand on them if the application source code passes a quick software test that JavaSoft will start administering early next year. One source said JavaSoft may charge a slight fee to run the 100% Pure Java test.

Although the tests could slow down development work, 100% Pure Java was strongly endorsed by dozens of smaller development houses last week, such as Activerse, Inc. and Ignite Technologies.

"If we go the way of Unix, Microsoft wins," Gosling warned.

"I think it's important that people know exactly the status of the language, for good and for bad," said Staffan Winstrom, a technician at L.M. Ericsson Data AB in Sweden, who had heard about the 100% Pure Java project. ■

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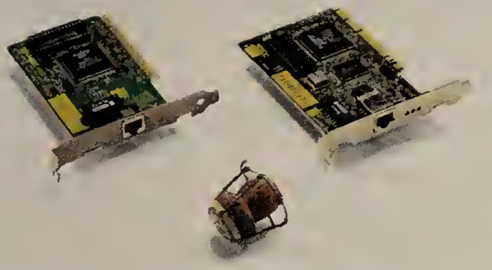

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CA

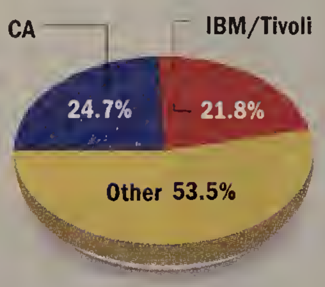
Continued from page 1

CA says its future growth lies in addressing customers' client/server computing and management needs. And it has underscored its ambitions there by acquiring Legent Corp. and Cheyenne Software, Inc., and partnering with Microsoft Corp., Intel Corp., Hewlett-Packard Co., Sun Microsystems, Inc., Digital Equipment Corp. and others

CA President and Chief Executive Officer Charles Wang states emphatically that CA-Unicenter is "the de facto standard in managing the enterprise infrastructure." Some feel it is incumbent on vendors and users to partner with CA to accomplish anything in systems management.

CA, IBM IN CLOSE RACE

1995 worldwide systems management market



Based on revenues of $6.7 billion

SOURCE: IDC, FRAMINGHAM, MASS

Mixed reactions

Yet, CA's impression of itself does not filter down to everyone in the user and analyst communities. Despite its success to date, some say CA's "de facto standard" positioning of CA-Unicenter is largely attributable to narcissism.

CA holds a slight lead in the distributed systems management market, according to International Data Corp. (IDC) in Framingham, Mass. But it does not have the kind of dominant position that Microsoft and Cisco Systems, Inc. hold in PC software and internetworking, respectively. There's still the long shadow of IBM and its Tivoli Systems, Inc. subsidiary.

"They are a pioneer and a dominating force in the market today. But as in everything, there are always alternatives," said CA-Unicenter user Render Swygert, senior systems executive with Chase Manhattan Mortgage in Tampa, Fla.

"We don't see partnering with CA at the Unicenter level critical to the success of distributed systems management vendors," said Christian Byrnes, vice president of services and systems management strategies at META Group, Inc. in Westport, Conn.

"They're just part of a larger community," said Brandon Musler, an analyst at Illuminata, Inc. in Nashua, N.H. "I don't think they can unilaterally drive anything anymore" as they once did in the mainframe arena.

Behind the curve

Case in point: Desktop management. That's one key area where CA has followed instead of led the pack, according to Musler. A number of big companies, including Microsoft and IBM, have been pushing desktop management standards via the Desktop Management Task Force (DMTF) for at least four years.

But CA just joined the DMTF in September as part of its Open Desktop Management Initiative. It also exposed an existing CA-Unicenter API for collecting data from various desktop agents.

CA will not concede that it has trailed others in desktop management. Company cofounder and Executive Vice President Russ Artzt, said, "Our goal is to provide complete enterprise management, on the desktop, on the servers, on the mainframes, on the big boxes, on switches, on everything. Where we don't have the specific function — today, we don't have desktop asset management — we'll integrate with [third-party offerings]."

Partnerships have been a big part of the CA-Unicenter story, but the only one that appears to be generating any real revenue for CA is a pact with Microsoft to develop a Windows NT version of CA-Unicenter. Artzt says NT versions of CA-Unicenter are selling well.

CA and Microsoft expanded that relationship last August by agreeing to incorporate Microsoft's object and Internet technology in CA-Unicenter/The Next Generation (TNG). CA also announced pacts with Intel and Tandem Computers, Inc. to tightly link Intel's hardware-based agents and LANDesk management software with CA-Unicenter/TNG, as well as develop a version of CA-Unicenter/TNG for fault-tolerant computing among Tandem, Windows NT and Unix servers.

It's too early to gauge the success of those deals. CA-Unicenter/TNG does not ship until January.

But the HP and Sun arrangements, which were disclosed in 1995, have been largely infertile. Under these deals, CA was supposed to develop separate software packages that bundled CA-Unicenter with HP's OpenView and with Sun's SunNet Manager. The Unicenter-OpenView product has been shipping since March 1995, but CA never developed a product from its arrangement with Sun,

How Unicenter fits into it all

Russell Artzt, executive vice president of research and development, and a cofounder of Computer Associates International, Inc., shared his vision of CA-Unicenter's role in distributed systems management with *Network World* Senior Editor Jim Duffy.

How does Unicenter work with your mainframe products?

We used CA-Unicenter/The Next Generation (TNG) to build some very powerful synergy with our mainframe products.

Our scheduling product is a good example. We have three types of scheduling clients on the mainframe. We've put in extensive integration between them and Unicenter's workload scheduler to the point where I can show on one workflow analysis screen the mainframe jobs running under one of our mainframe schedulers, and all the jobs running on Unix or NT. I can even see the cross-job dependencies.

Security violations can get routed down to Unicenter TNG, and you'll actually see them on a TNG map on an Intel machine. We can discover SNA devices [linked to] a mainframe in a VTAM network.

Do you believe you're further along than IBM and Tivoli in integrating the distributed systems and data center management environments?

We're literally years ahead technology-wise. We're the first product that is totally integrated; we're the first product that has the full gamut of management functions built-in; we're the first that has the full end-to-end management of enterprise networks, full application management, database management and operating systems management.

We also have this thing called business process views [in TNG]. They let the client select whatever object they want to monitor. It can be a payroll application across several CPUs. Or maybe they just want to monitor their Chicago location, maybe they just want to monitor all the routers in the network, or specific applications such as accounts payable or billing. They can do it.

How important is desktop management to CA-Unicenter's growth?

That's a whole big segment of Unicenter and TNG. The whole area of desktop management is growing very quickly.

We started an initiative called the Open Desktop Management Initiative with DMI. We did that to show our openness. We can support any number of popular desktop managers out there today. Because they use DMI 2.0, we support them right out of the box. Once you support these standards, you're able to do a lot.

www.microsoft.com/office/97/viva_

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although a CA end user and reseller is offering a product based on integration work done by CA.

"The [deals] with HP and Sun have borne very little fruit," said Paul Mason, research director for systems management at IDC. "It's not a major source of revenue for [CA]."

CA's Artzt disputes that. "Not true," he said. "A lot of our clients buy [the bundled products]." But he added, "I don't know what the numbers are."

Regardless, CA-Unicenter continues to gain market and mind share, if CA's numbers are precise. But that's a big if.

Analysts caution that CA practices the "wrap and roll" method of sale, in which CA-Unicenter is bundled and sold with other CA products. Thus, CA-Unicenter is "sold" to a user whether that user wants the product or not, and the value of the bundled sale is accounted for as a CA-Unicenter-only sale.

Artzt does not dispute this, but he says CA-Unicenter is also sold stand-alone.

"It's hard to break [CA-Unicenter revenue] out," he said. "We do so much business with Unicenter, and mainframe products and other products. We do so many enterprise deals where we sell our database and we sell Unicenter, and we sell everything [along with Unicenter]."

What's the bottom line? That CA is a power in distributed client/server systems management is indisputable. Analysts say CA will remain one of the top two systems management vendors — IBM/Tivoli being the other — for the foreseeable future with particular strengths in scheduling, security, software distribution and database management.

But the company needs to bulk up its desktop management capabilities, observers note, and is just now doing so through the arrangements with Intel and Microsoft, and its Open Desktop Management Initiative.

So for now, analysts say, CA's claims that it is the last word — the "de facto standard" — in distributed systems management may just be a case of the company looking at its reflection and admiring what it sees. ■

Cisco

Continued from page 1

ing over the past few years to become more than a router vendor. It has done this by offering products and services to help it compete with IBM for control of the data center and corporate backbones where Big Blue remains strong.

Observers said the Cisco news could be good for IBM's big iron folks, though not so good for its network group, which has its own SNA-to-IP migration offerings.

"IBM's [CEO] Lou Gerstner should love this announcement because it strengthens the role of the mainframe as a server and makes his vision of network computing a reality for mainframe customers," said Anura Guruge, an independent analyst based in New Ipswich, N.H. "The products and alliances announced here bring the mainframe into contemporary networks without any barriers."

Key to Cisco's strategy will be IOS/390, a new MVS-based application that blends Interlink Computer Sciences, Inc.'s TCPaccess product and IOS routing features. TCPaccess is an MVS application that allows TCP/IP connectivity to the mainframe.

Cisco will enhance IOS/390 to include TCP/IP Offload, security and support for IBM's Sysplex environment.

Combining IOS/390 with Cisco's Channel Interface Processor (CIP), a router add-on that provides mainframe channel connectivity, will let the mainframe become a high-capacity server for Internet or intranet applications, Francis said. CIP supports mixed SNA and TCP/IP communications options such as tn3270 to Data Link Switching.

"We see IOS/390 as a way to bring IOS routing and other capabilities directly onto the mainframe," Francis said. "Early next year, we'll add our own extended features, such as bandwidth reservation, redundancy and improved mainframe cycle utilization for that package."

Under the new agreement, Cisco takes an equity position in Interlink, and the companies will jointly develop, sell and support future IOS/390 products.

Another new package, WebAccess/390, will let anyone using a Web browser access SNA applications over a corporate intranet or an Internet-based backbone. WebAccess/390 is built on technology Cisco licensed from OpenConnect Systems, Inc.'s OC://WebConnect and OpenVista Internet access and application development products.

Cisco will enhance the OpenConnect products so they will be compatible with IOS/390. In addition, Cisco will add features such as a Java-based High Level Language API and performance improvements, Francis said. While Cisco had its wallet out, it also bought into OpenConnect, and both companies will develop, sell and service future products.

As expected, Cisco also announced it will support MultiPath Channel (MPC) and High Performance Routing in its CIP router by first-quarter 1997 (*NW*, Nov. 25, page 1). MPC enables high-performance communications between the mainframe and downstream channel-attached devices. ■

Boole buys rival MAXM for $25m

By Jim Duffy

San Jose, Calif.

Boole & Babbage, Inc. last week moved to solidify its leadership in high-end systems management by acquiring rival MAXM Systems Corp. for about $25 million.

The companies competed head-to-head in the market for global event management systems, or "managers of managers." These systems provide a single view of enterprisewide systems and network events collected by element and device managers, and usually sell for between $50,000 and $100,000.

Indeed, Boole's Command/Post and MAXM's MAX/Enterprise offerings — two of the leading products in the global event management market — overlap considerably. The MAXM acquisition now makes Boole the leader in the $300 million market with a 15% share of revenue, according to International Data Corp. (IDC), a market research firm in Framingham, Mass. Boole is followed closely by Objective Systems Integrators, Inc. and Computer Associates International, Inc., each with a 14% market share, IDC said.

Boole mainly acquired MAXM to eliminate a competitor and increase market share, acknowledged Paul Newton, Boole's president and chief executive officer. "This was not so much a technology acquisition, but one to build critical mass," he said.

Some analysts believe that Boole's Command/Post has a bit of a technical edge on MAX/Enterprise.

"This was not so much a technology acquisition, but one to build critical mass," Newton said.

"[Boole] had better agents they could put out there that MAXM didn't have," said Paul Mason, program director for systems infrastructure software at IDC.

Newton admitted that MAXM approached Boole to initiate the deal. This may indicate that privately held MAXM was experiencing some financial malaise.

"If you look at the price, here's [MAXM] that supposedly did $20 million in revenue and yet was bought for $25 million," IDC's Mason said. "You don't sell a highly profitable $20 million company for $25 million."

MAXM users were guarded in their appraisal of the union.

"We're cautiously optimistic that the investment we made will be safeguarded, and in the long run, we'll see significant benefit," said John Lewis, vice president of information systems at the First National Bank of Maryland in Baltimore.

Boole expects to complete the MAXM purchase next month. ■

order/

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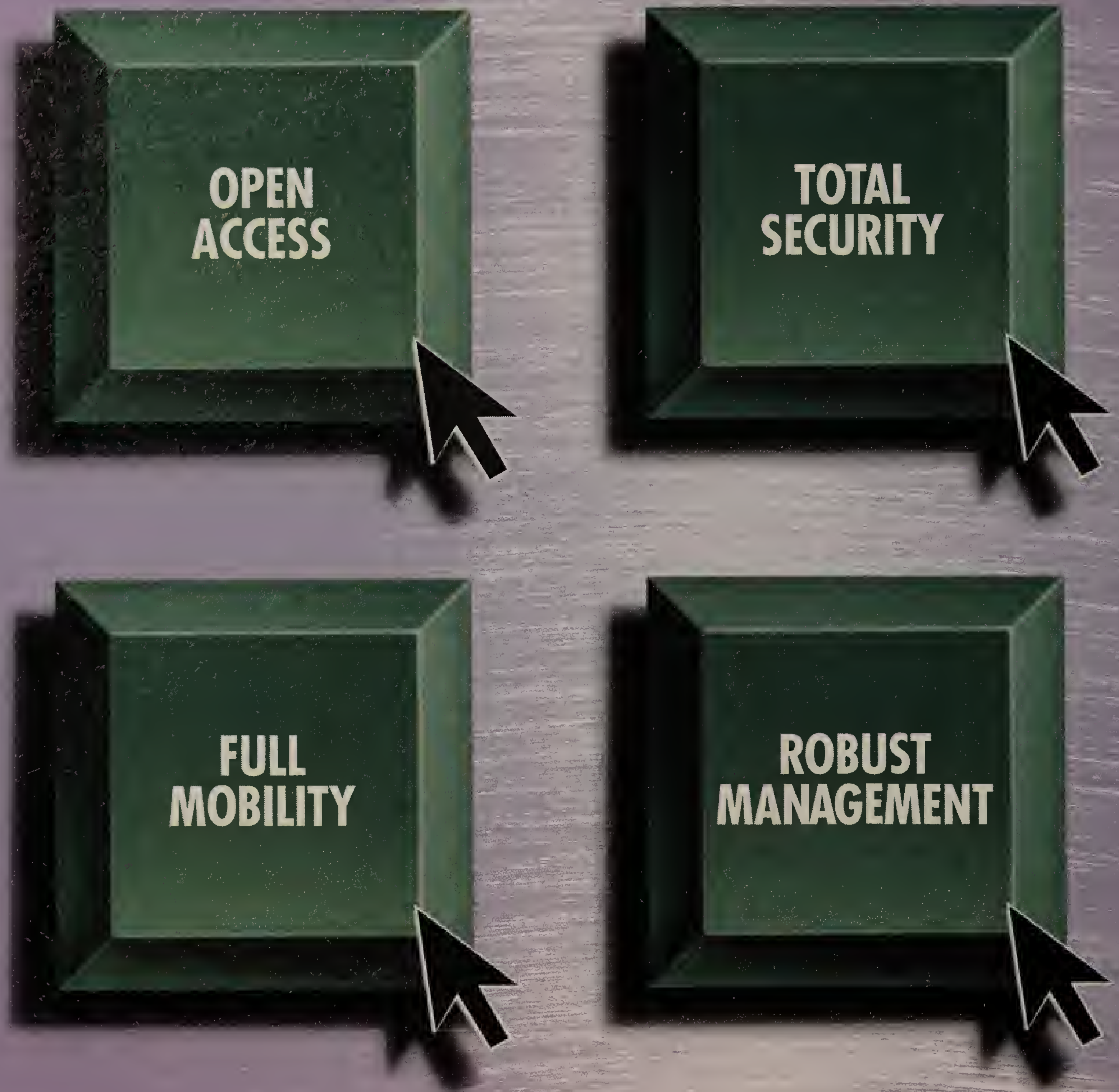

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1 Industry: (check one only)

01. ☐ Manufacturers (other)
02. ☐ Finance/Banking
03. ☐ Insurance/Real Estate/Legal
04. ☐ Health Care Services
05. ☐ Hospitality/Entertainment/Recreation
06. ☐ Media/TV/Cable/Radio/Print
07. ☐ Retail/Wholesale Trade/Business Services
08. ☐ Transportation
09. ☐ Utilities
10. ☐ Education
11. ☐ Process Industries (Mining/Construction/Petroleum Refining/Agriculture/Forestry)
12. ☐ Government (Federal/State/Local)
13. ☐ Military
14. ☐ Aerospace
15. ☐ Consultants (Independent)
16. ☐ Carriers/Interconnects
17. ☐ Manufacturers (Computer/Communications)
18. ☐ Resellers of Computer/Network Products (VARs, VADs)
19. ☐ Systems/Network Integrators
20. ☐ Distributors (Computer/Communications)
21. ☐ Other *(please specify)* __________

2 What is your job function? (check one only)

NETWORK IS MANAGEMENT:

1. ☐ Networking Management
2. ☐ LAN Management
3. ☐ Datacom/Telecom Management
4. ☐ IS, IT, MIS, Systems Management
5. ☐ Engineering Management
6. ☐ Corporate Management (CIO, CEO, Pres., VP, Dir., Mgr., Financial Management)
7. ☐ Consultant (Independent)
8. ☐ Other *(please specify)* __________

3 What is the estimated value of networking equipment and services that you help specify, recommend or approve? (check one only)

01. ☐ $100 million or more
02. ☐ $50 mil. - $99.9 mil.
03. ☐ $25 mil. - $49.9 mil.
04. ☐ $20 mil. - $24.9 mil.
05. ☐ $10 mil. - $19.9 mil.
06. ☐ $5 mil. - $9.9 mil.
07. ☐ $1 mil. - $4.9 mil.
08. ☐ $500,000 - $999,999
09. ☐ $250,000 - $499,999
10. ☐ $100,000 - $249,999
11. ☐ None of the above

4 What is the total number of sites for which you have purchase influence? (check one only)

1. ☐ 100+
2. ☐ 50 - 99
3. ☐ 20 - 49
4. ☐ 10 - 19
5. ☐ 2 - 9
6. ☐ 1
7. ☐ None

5 Are you involved in the purchase of and/or plan to purchase network products and services?

☐ Yes ☐ No

6 Check ALL that apply in Columns A and B:

A. I am involved in the purchase of the following products/services:
B. I plan to purchase the following products/services:

LOCAL-AREA NETWORKS
A B
☐ 01. ☐ Local-Area Networks
☐ 02. ☐ Network Op. Sys. Software
☐ 03. ☐ LAN Storage/Backup
☐ 04. ☐ Optical LAN Storage/Backup
☐ 05. ☐ Disk LAN Storage/Backup
☐ 06. ☐ Tape LAN Storage/Backup
☐ 07. ☐ RAID LAN Storage/Backup
☐ 08. ☐ Network Test/Diagnostic Tools
☐ 09. ☐ Cables, Connectors, Baluns
☐ 10. ☐ UPS
☐ 11. ☐ Network Interface Cards
☐ 12. ☐ Peer-to-Peer LANs
☐ 13. ☐ SNMP Network Management
☐ 14. ☐ ATM Switches
☐ 15. ☐ Token-Ring Switches
☐ 16. ☐ Ethernet Switches
☐ 17. ☐ Remote LAN Access/Communications Servers
☐ 18. ☐ Superservers
☐ 19. ☐ File/Application Servers
☐ 20. ☐ Print Servers/Fax Servers
☐ 21. ☐ CD-ROM Servers
☐ 22. ☐ LAN Servers

INTERNETWORKING
A B
☐ 23. ☐ Bridges
☐ 24. ☐ Routers
☐ 25. ☐ Bridge/Router
☐ 26. ☐ Gateways
☐ 27. ☐ Intelligent Hubs
☐ 28. ☐ Stackable Hubs

COMPUTERS/PERIPHERALS
A B
☐ 29. ☐ Laptops/Notebooks/Sub-Notebooks
☐ 30. ☐ Micros/PCs
☐ 31. ☐ Minis
☐ 32. ☐ Mainframes
☐ 33. ☐ Workstations
☐ 34. ☐ Terminals
☐ 35. ☐ Printers/Network Printers
☐ 36. ☐ Cluster Controllers
☐ 37. ☐ CD-ROM
☐ 38. ☐ Fax/Modem Boards

REMOTE/WIRELESS COMPUTING
A B
☐ 39. ☐ PDAs
☐ 40. ☐ PCMCIA Devices
☐ 41. ☐ Wireless Data Services
☐ 42. ☐ Wireless Data Equipment
☐ 43. ☐ Wireless LANs
☐ 44. ☐ Cellular Equipment & Services

INTERNET/INTRANET
A B
☐ 45. ☐ Internet Access Service
☐ 46. ☐ Firewalls/Security
☐ 47. ☐ Web Servers

INTERNET/INTRANET (cont'd)
A B
☐ 48. ☐ Web Browsers
☐ 49. ☐ Intranet Applications/Groupware
☐ 50. ☐ Search Retrieval Products (web crawler)
☐ 51. ☐ Internet Development Tools
☐ 52. ☐ Internet Commerce Tools

SOFTWARE/APPLICATIONS
A B
☐ 53. ☐ Network Management
☐ 54. ☐ Systems Management
☐ 55. ☐ Security
☐ 56. ☐ Communications Software
☐ 57. ☐ Terminal Emulation
☐ 58. ☐ Word Processing
☐ 59. ☐ Operating Systems
☐ 60. ☐ Client/Server Applications Development
☐ 61. ☐ Database Management/RDBMS
☐ 62. ☐ Spreadsheet
☐ 63. ☐ Groupware
☐ 64. ☐ EDI
☐ 65. ☐ E-mail
☐ 66. ☐ Windows/Graphical User Interface
☐ 67. ☐ Multimedia
☐ 68. ☐ Graphics/DTP
☐ 69. ☐ Remote Access
☐ 70. ☐ Imaging
☐ 71. ☐ Server Suites (Back office, etc.)
☐ 72. ☐ Suites
☐ 73. ☐ Middleware
☐ 74. ☐ Document Management
☐ 75. ☐ Database Server
☐ 76. ☐ Site Metering Tools
☐ 77. ☐ Computer-Integrated Telephony (CIT)

WIDE-AREA NETWORK EQUIPMENT & SERVICES
A B
☐ 78. ☐ Frame Relay Equip./Services
☐ 79. ☐ Modems
☐ 80. ☐ FT-1/T-1/T-3 Multiplexers
☐ 81. ☐ FT-1/T-1/T-3 Services
☐ 82. ☐ SONET
☐ 83. ☐ Inverse Multiplexers
☐ 84. ☐ SMDS
☐ 85. ☐ Asynchronous Transfer Mode
☐ 86. ☐ Diagnostic/Test Equipment
☐ 87. ☐ DSU/CSU
☐ 88. ☐ VSAT/Satellite
☐ 89. ☐ ISDN Equipment & Services
☐ 90. ☐ PBXs
☐ 91. ☐ Voice Mail/Response
☐ 92. ☐ Videoconferencing
☐ 93. ☐ Leased Lines
☐ 94. ☐ Switched Data
☐ 95. ☐ E-mail
☐ 96. ☐ 800/900/MTS Services
☐ 97. ☐ Virtual Networks
☐ 98. ☐ Outsourcing/Systems Integration Services
☐ 99. ☐ Education/Training Services

☐ 107 ☐ None of the above (1-99)

7 Check ALL that apply in Columns A and B:

A. The following network platforms are currently installed:
B. The following network platforms are planned for purchase:

NETWORK PROTOCOLS
A B
☐ 01. ☐ SNA
☐ 02. ☐ DECnet
☐ 03. ☐ TCP/IP
☐ 04. ☐ Novell IPX/SPX
☐ 05. ☐ APPC/APPN/LU 6.2
☐ 06. ☐ NETBIOS
☐ 07. ☐ AppleTalk
☐ 08. ☐ NFS
☐ 09. ☐ IPv6
☐ 10. ☐ SNMP/SNMPv2
☐ 11. ☐ Other *(please specify)* __________

NETWORK OPERATING SYSTEM
A B
☐ 12. ☐ Microsoft (LAN Manager)
☐ 13. ☐ Novell (NetWare 2.X, 3.X)
☐ 14. ☐ Novell (NetWare 4.X)
☐ 15. ☐ Windows NT
☐ 16. ☐ Windows NT/Advanced Server
☐ 17. ☐ LocalTalk (AppleTalk)
☐ 18. ☐ Banyan (VINES)
☐ 19. ☐ IBM (LAN Server)
☐ 20. ☐ IBM (PC LAN Program)
☐ 21. ☐ Artisoft (LANtastic)
☐ 22. ☐ Digital (Pathworks)
☐ 23. ☐ Other *(please specify)* __________

LAN ENVIRONMENT
A B
☐ 24. ☐ 4M Token Ring
☐ 25. ☐ 16M Token Ring
☐ 26. ☐ Ethernet
☐ 27. ☐ Fast Ethernet
☐ 28. ☐ 100vg Any LAN
☐ 29. ☐ FDDI
☐ 30. ☐ LocalTalk
☐ 31. ☐ 10Base-T
☐ 32. ☐ ATM
☐ 33. ☐ Other *(please specify)* __________

COMPUTER OPERATING SYSTEM
A B
☐ 34. ☐ DOS
☐ 35. ☐ Unix/Xenix/AIX
☐ 36. ☐ OS/2
☐ 37. ☐ OS/2 Warp
☐ 38. ☐ IBM MVS
☐ 39. ☐ IBM VM
☐ 40. ☐ Digital VMS
☐ 41. ☐ Macintosh
☐ 42. ☐ Windows
☐ 43. ☐ Windows 95
☐ 44. ☐ NT
☐ 45. ☐ Solaris
☐ 46. ☐ Other *(please specify)* __________

☐ 47. ☐ None of the above (1-46)

8 What is your scope and involvement in purchasing decisions for network products & services for your enterprise?

A. SCOPE
(check one only)
1. ☐ Corporate/Enterprise
2. ☐ Department
3. ☐ None

B. INVOLVEMENT (check all that apply)
1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need.
5. ☐ None

9 What is the total number of LANs, workstations/nodes at this location/in your organization?

At this location:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

Entire organization:

	LANs		Workstations/ Nodes
1.	☐	5,000+	☐
2.	☐	1,000 - 4,999	☐
3.	☐	100 - 999	☐
4.	☐	50 - 99	☐
5.	☐	10 - 49	☐
6.	☐	1 - 9	☐

10 Please indicate your involvement in developing/implementing Internet/Intranet Technologies: (check all that apply)

1. ☐ Recommend/Specify
2. ☐ Approve
3. ☐ Evaluate
4. ☐ Determine the need
5. ☐ Implement
6. ☐ None

11 Which of the following hardware platforms are installed/planned in your company? (check all that apply)

Mainframes	A – Installed	B – Planned
1. IBM	☐	☐
2. Amdahl	☐	☐
3. Cray	☐	☐
4. Hitachi	☐	☐
5. Unisys	☐	☐

Minis	C – Installed	D – Planned
1. IBM	☐	☐
2. Digital	☐	☐
3. Tandem	☐	☐
4. Unisys	☐	☐
5. AT&T GIS	☐	☐
6. HP	☐	☐
7. Data General	☐	☐

What is the total number of Servers/Clients installed/planned: (USE NUMBERS ONLY)

E-AT THIS LOCATION	#	F-% with Internet Access
1. Servers		%
2. Clients		%

G-ENTIRE ORGANIZATION	#	H-% with Internet Access
1. Servers		%
2. Clients		%

Which of the following Servers/Clients do you have installed/planned: (CHECK ALL THAT APPLY)

	At this location:		Entire organization:	
	I-Servers	J-Clients	K-Servers	L-Clients
01. Power PC	☐	☐	☐	☐
02. Power Mac	☐	☐	☐	☐
03. Mac Other	☐	☐	☐	☐
04. Multi Processor Servers	☐	☐	☐	☐
05. P6	☐	☐	☐	☐
06. Pentium Pro	☐	☐	☐	☐
07. Pentium	☐	☐	☐	☐
08. 486	☐	☐	☐	☐
09. 386	☐	☐	☐	☐
10. 286	☐	☐	☐	☐
11. Risc	☐	☐	☐	☐
12. Other	☐	☐	☐	☐

12 Estimated gross annual revenue of your entire company/institution: (check one only)

1. ☐ $10 billion or more
2. ☐ $1 billion to $9.9 billion
3. ☐ $500 million to $999.9 million
4. ☐ $100 million to $499.9 million
5. ☐ $50 million to $99.9 million
6. ☐ $10 million to $49.9 million
7. ☐ $5 million to $9.9 million
8. ☐ $4.9 million or less
9. ☐ None of the above

13 Estimated number of employees at this location/in entire organization:

At this location:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

Entire organization:
1. ☐ Over 10,000
2. ☐ 5,000 - 9,999
3. ☐ 2,500 - 4,999
4. ☐ 1,000 - 2,499
5. ☐ 500 - 999
6. ☐ 499 or less

14 For which areas outside of North America do you have purchase influence? (check all that apply)

1. ☐ Europe
2. ☐ Asia
3. ☐ South America
4. ☐ Australia
5. ☐ Middle East
6. ☐ None

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Briefs

Bull HN Information Systems, Inc. *has bulked up the* **application management** *capabilities of its ISM/OpenMaster platform. The company rolled out agents that provide application file, trace, error and process monitoring; software for managing Sybase, Inc., Informix Software, Inc. and Microsoft Corp. databases; a package that controls SAP R/3 environments; and a program that provides administration of Tuxedo transaction processing applications.*

The products are priced from $625 to $5,000 and will be available before year-end.

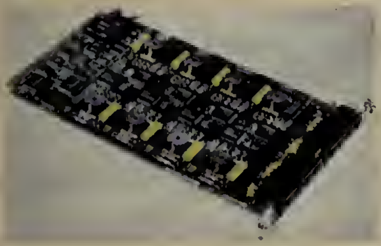
Bull: (800) 285-5727.

Make Systems, Inc. *unveiled Version 2.6 of its NetMaker XA system, which now supports* **SNA-to-router network migration** *tools, frame relay net simulation and traffic baselining capabilities.*

NetMaker XA 2.6 costs between $1,500 and $14,995. It will be available this week.

Make: (415) 941-9800.

Ascend Communications, Inc. *has announced a line of* **Asymmetric Digital Subscriber Line (ADSL)** *and* **Symmetric DSL (SDSL)** *hardware*



for its access switch gear. A six-port ADSL card and a 16-port SDSL card will be available in February for $8,250 and $8,500, respectively. An ADSL card supporting the other technology, discrete multitone (DMT), is due in the second quarter.

The DSLPipe-C, a customer modem for the ADSL CAP offering, is available now for $1,750. The DSLPipe-S for SDSL will be available in February for $1,750. The DSLPipe-D for the ADSL DMT offering will be available in the second quarter.

Ascend: (510) 769-6001.

Getting corporate intranets under control

Resonate tackles multiserver intranet management challenge

By Michael Cooney
Mountain View, Calif.

Silicon Valley start-up Resonate, Inc. last week announced software aimed at helping companies better manage large multiserver Internet and intranet sites.

Company officials claim their Resonate Dispatch 1.0 package will help users that are deploying Internet and intranet commerce or publishing applications to more efficiently load-balance Web site traffic, simplify the administration of multisite Web hosts and ensure high-availability of intranet servers.

"Managing the performance, cost and reliability of multiserver Internet sites is accomplished today, if at all, via a patchwork of homegrown applications that don't really help users with completely managing distributed intranet sites," said Chris Marino, president and chief executive officer of Resonate. "Dispatch lets users group widely distributed servers as one, improving performance and scalability, and reducing administration."

Over *90% of the Fortune 200 are building intranet applications, and managing that environment will probably become an issue, says Resonate's Marino.*

Dispatch consists of three components — agent software that runs on each Web server, a Java-based Dispatch Manager console and a TCP/IP stack for connectivity. In its first release, the package runs on Sun Microsystems, Inc.'s scalable processor architecture (SPARC)-based servers running Solaris 2.5 or higher. The package lets administrators define multiple servers running the Dispatch agent as a single site with one virtual IP address, no matter where the servers are located. One of the Dispatch agents is then defined as a primary scheduler, which, in turn, uses Resonate's Resource Scheduling technology to receive and redirect all incoming traffic to its proper destination on the site. Other servers can be designated as backup schedulers that will automatically take over should the primary server fail, Marino said.

Resource Scheduling is the company's ace in the hole because it reads an incoming URL request and uses a process called "IP connection hop" to transfer the request to the target server, which then responds directly to the user. Once a server or set of resource servers has been identified, Resource Scheduling can load-balance among those servers to improve response times and performance to the user.

"Since Dispatch can match specific requests with targeted servers, Web administrators can segregate Web content across servers, which improves overall performance of the site," Marino said.

"Critical Web content can be replicated across servers for high availability, and Dispatch recognizes failing servers and can redirect traffic to a new server if necessary," he said.

The Dispatch Manager component lets systems administrators set up and define the Dispatch site, as well as define scheduling rules and monitor the performance of the site.

Dispatch Manager cannot communicate with larger enterprise managers such as IBM/Tivoli's TME 10 manager.

Resonate is just getting its feet wet in what is becoming a big pool of competition. Cisco Systems, Inc., IBM, Sun and other big-name players have targeted the Internet/intranet server management arena in the past year. But vendors still must address key areas such as scalability, managing geographically scattered resources and multiple Web site content management, analysts said.

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"Resonate's approach to the distributed Internet server market is unique in the way they use resource-based scheduling to control and balance traffic over multiple servers," said Jasmine Noel, an analyst at D.H. Brown & Associates in Port Chester, N.Y. "It's very early in this market though, and competition is going to be high."

Dispatch is available starting at $7,995 for a two-server license.

©Resonate: (415) 967-6500.

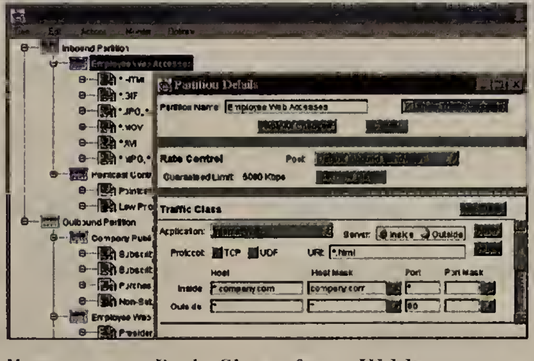
Start-up company offers Internet crowd control

Packeteer seeks to offer quality of service on Web hits, prioritizing access for certain users.

By Jim Duffy
Campbell, Calif.

A start-up company has unveiled what it claims is a new class of network device that addresses the problem of "crowd control" on the Internet.

Packeteer, Inc. last week rolled out PacketShaper, a hardware and software product that lets network managers or Webmasters set and enforce policies by which access priorities can be assigned to individuals or groups of end users.



Partition Name: Employee Web Accesses
Guaranteed Limit: 5000 Kbps
Protocol: TCP UDP URL: *.html
Inside: *.company.com company.com
Outside: 80

Users *manage PacketShaper from a Web browser.*

With these policies, PacketShaper can assign increments of 10M bit/sec bandwidth to traffic based on priorities established by IP address or application type.

"If you think of this whole debate that's going on within the industry right now on how to make TCP/IP behave better, all of it requires major changes to the network," said Bobbi Murphy, principal analyst at Dataquest, Inc. "This is more of a point solution, but it's very practical. You can plop it down in front of an exisitng network and make something happen today."

PacketShaper hardware features two Ethernet ports and sits between a hub and router. PacketShaper software manipulates the rate of individual TCP connections via control headers, said Bob Quillin, Packeteer's vice president of marketing. Essentially, PacketShaper spoofs TCP acknowledgments to keep sessions alive, enabling the product to control bandwidth usage without discarding packets.

The device also allows companies to monitor service levels based on connection speed, network congestion, stuck servers, "stop button" hits and retransmission rate.

PacketShaper is manageable via popular HTML browsers, such as Netscape Communications Corp.'s Navigator and Microsoft Corp.'s Internet Explorer. The product will be available in January for $7,250.

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WANs & Internetworking

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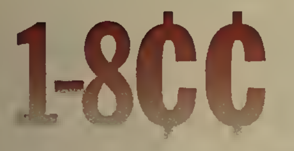
Briefs

■ **Sprint Corp.** *has asked the Federal Communications Commission to rescind a September ruling ordering carriers to pay independent pay phone owners as much as 35 cents per call when an* **800 number** *is dialed from*



a pay phone. Pay phone owners had complained that heavy 800 usage deprives them of revenue from pay phone users.

Sprint countered that the FCC order is "a $1 billion annual corporate welfare program" for pay phone owners and could force up rates for 800 services.

■ *LDDS WorldCom and* **Premisys Communications, Inc.** *earlier this month announced a new relationship under which WorldCom will use Premisys' Integrated Multiple Access Communications Server to offer dedicated Internet access services. Deployed at the customer site, the servers allow users to integrate their data and voice traffic onto the same dedicated T-1 connection they use for their Internet access.*

■ **Transaction Network Services (TNS)** *last week announced that, under a renewed contract, it will offer and support* **ISDN** *and* **Cellular Digital Packet Data** *services for Alliance Data Systems. Alliance, a transaction processing service company, has used TNS' network since 1993.*
TNS is a Reston, Va.-based data communications services provider for transaction processing users.

■ **Cascade Communications Corp.** *recently weighed in with new switch software to help carriers* **unclog the Internet.** *IP Navigator incorporates IP routing functionality into Cascade B-STDX 9000 frame relay and CB 500 ATM switches.*

BellSouth service turns a little data into a big gain

Wireless service used for meter reading, restocking Coke cans.

By Paul Desmond

Sometimes less is more.

That certainly seems to be the case with Cellemetry, the wireless data service BellSouth Wireless, Inc. is rolling out. You can keep your ATM WAN — and forget about Gigabit Ethernet. With Cellemetry, a mere 10 to 32 bits gets the job done.

Cellemetry is a cellular-based telemetry service — telemetry being the transmission of infrequent, short data bursts. In this case, "burst" is even a bit strong, given that 32 bits translates into about four characters. But in binary form, that's more than enough to flip a switch, get a meter reading, see how much Coke is left in a machine or take the temperature of a hen house.

The technology promises to cut costs for users in any industry that needs to keep tabs on far-flung sites, devices, vehicles and anything else that can be outfitted with a modicum of computing intelligence. So far, according to Terry White, manager of commercial operations at BellSouth, the company has identified four main applications: alarm notification; meter reading or measurements; remote sensing, including turning valves or devices on and off; and geopositioning, meaning the tracking of containers, cars and the like.

Just two weeks ago, UPLINK Technologies, a systems administrator for wireless transmission of alarm signals, announced SunTrust Bank, Atlanta is testing the service. Bill Reeves, assistant vice president at the bank, said Cellemetry could be added to the arsenal of technologies — mainly leased line, cellular and dial-up — that the bank employs for its various monitoring needs.

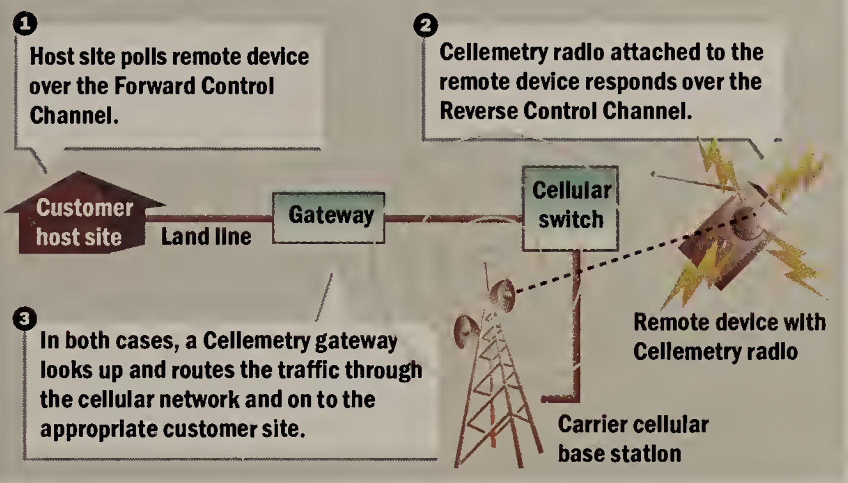
"It's far less expensive" than any of the other means, Reeves said. And so far, it has checked out well in the lab.

Cellemetry uses spare capacity in cellular network signaling channels to transmit data. A radio about the size of — you guessed it — a credit card, ships out data in spurts of as many as 32 bits and receives signals of 10 bits.

To the cellular network, the radio device looks like a roaming cellular phone. The 32-bit burst, sent over the cellular Reverse Control Channel, looks like the signaling message a cell phone sends out to attach to the network when it is powered up. But instead of terminating at a switch operated by whatever cellular carrier owns the roaming phone, the message stops at the Cellemetry Gateway, a computer that shuttles data between the radios and the appropriate customer's host site.

CELLEMETRY SUPPORTS BIT-BY-BIT REMOTE MONITORING

The signaling channel of a cellular network can be used for Cellemetry, monitoring remote devices with bursts of 10 bits outbound and 32 bits back.


❶ Host site polls remote device over the Forward Control Channel.
❷ Cellemetry radio attached to the remote device responds over the Reverse Control Channel.
Customer host site
Land line
Gateway
Cellular switch
❸ In both cases, a Cellemetry gateway looks up and routes the traffic through the cellular network and on to the appropriate customer site.
Remote device with Cellemetry radio
Carrier cellular base station

Similarly, the host site can poll remote radios in 10-bit spurts over the cellular Forward Control Channel, which is used to beacon control data in a cellular net. All this happens without ever opening up a real cellular call, keeping the cost down.

BellSouth has more than 40% of the country's population covered with Cellemetry, and is ahead of its 66% target for the end of 1997. The company is busy striking partnerships with cellular carriers and service providers such as UPLINK, not to mention fielding inquiries from users with new applications.

"We do not pretend to know the breadth of people who have a need," White said. "When people approached us about temperature control in hen houses, that had not occurred to us."

Or take the vending business. White says Cellemetry can improve productivity 30% because drivers will have inventory data in hand from the get-go — they will not need to first go into a building to check how much Coke and candy they need to bring in.

The amount of the savings in any given business will help determine the price customers pay. BellSouth completes an analysis to determine how much an existing monitoring process costs and how much Cellemetry can save. The price of the service then falls somewhere in between. The price of each radio, however, is $100.

That could initially be a stumbling block, said Susan Aldrich, senior consultant and editor with Patricia Seybold Group, Inc. in Boston.

"But we all know what happens to technology costs. And I have no doubt that there are companies for which the cost of this will seem small," she said. "What we have here is a very good idea."

©BellSouth Wireless: (404) 249-4988.

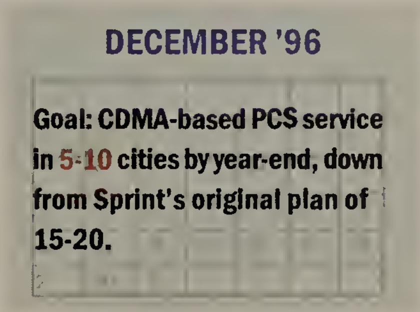
Nortel software slows Sprint PCS

By Denise Pappalardo

Users planning to jump on to a Sprint Personal Communications Service (PCS) network during this holiday season may have to wait for the new year.

Sprint PCS planned to announce Code Division Multiple Access (CDMA)-based PCS service in 15 to 20 cities by year-end. But those numbers have been cut to between five and 10.

Sprint PCS blames maintenance and administration software problems on some of Northern Telecom, Inc.'s network equipment. Nortel confirmed "slight delays" with some of its management software, but believes the problems will be resolved by mid- to late January, a company spokesman said. While Nortel is working out the kinks, 10 to 15 cities will wait at least another three months for PCS service, said a Sprint PCS spokesman.



DECEMBER '96

Goal: CDMA-based PCS service in 5-10 cities by year-end, down from Sprint's original plan of 15-20.

"The scale of this launch is gigantic. This is a minor delay," the spokesman said.

The PCS service that will be offered by year-end will be based on Lucent Technologies, Inc.'s CDMA networks, according to the Sprint spokesman. When Sprint made its investment in PCS, it signed Nortel and Lucent as net infrastructure partners, and then designated in which cities each vendor would build out the Sprint PCS network.

While Sprint has not met its aggressive deadlines, it's "much, much, much better to get it right first before the service is out there," said Iain Gillott, director of wireless and broadband networks at International Data Corp./LINK wireless division in Austin, Texas. Sprint does not need 20 markets with service and billing problems, he said.

At press time, Sprint would not reveal in which cities it would first launch its PCS service. ■

WAN MONITOR

Sun's Java effort shines on BT/MCI

Putting highly graphical information in the hands of customers has never been easy or cheap for carriers. But that may be changing, thanks to new Web-based technologies and small handheld devices that can access the Internet.

At Sun Microsystems, Inc.'s big JavaStation announcement a few weeks back, vendors lined up to support the effort. While most of the vendors were talking about what their applications could do, British Telecommunications plc was live with a customer, providing network management and a customer service application using Sun's technology.

The Java-based application is the next stage of BT's ServiceView system, which provides service management today. ServiceView will handle all customer information and services interaction in the future. It's hard to quantify the benefits this will bring to customers and carriers, but who can argue with sharing information among salespeople, service representatives and customers?

The interesting thing is that these front-end interfaces are connected with BT's back-office systems, allowing for direct querying of transactions and updating of system databases by the customer.

The advent of Java and the JavaStation starts to push this management capability out to the customer in an economical and easy-to-use fashion.

BT is working now to integrate its internal Work Manager system — which provides electronic distribution of work to mobile engineers — with a Java-enabled browser on Nokia Corp.'s 9000 cellular phone/personal digital assistant wireless access device. This will let the mobile engineers stay in touch with BT's IS group.

Mobile engineers equipped with these units will also have access to remote testing and diagnostic capabilities so they can perform customer support.

Java-based information and reporting could start showing up in 1997 on a broad range of devices, including set-top boxes and television sets — any device based on the network computer standard.

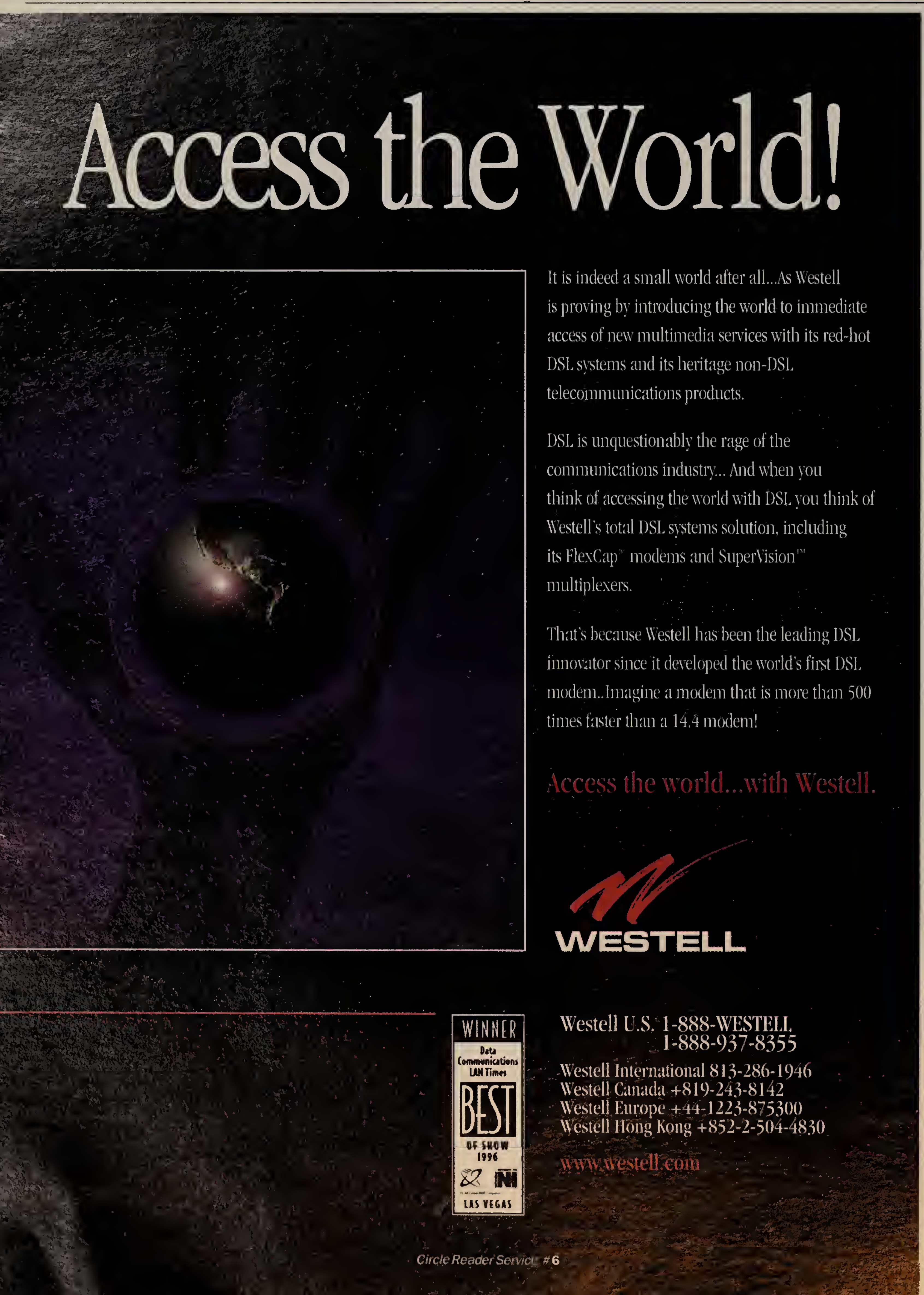
LDDS WorldCom already offers a Web-based net management interface to its frame relay customers, and other carriers are expected to deliver such interfaces in 1997.

The BT system today is largely for internal use, but a business case is being pressed to launch the system commercially in early 1997. With the recent BT/MCI Communications Corp. merger, the system could conceivably find its way onto U.S. soil before long.

However, a couple of hurdles will need to be jumped to make the BT system work with Sun's JavaStation. BT's system requires an ISDN interface, which Sun says it is working on. Sun also needs to include flash memory in its device to hold the current operating system, instead of requiring the end user to repeatedly download it. Sun is working on this, as well. A few pieces of ServiceView are still not translated to Java. That will change by year-end.

Daniel Briere and Christine Heckart

Briere is president and Heckart is director of broadband with TeleChoice, Inc., a consultancy in Verona, N.J. They can be reached at dbriere@telechoice.com and checkart@telechoice.com.



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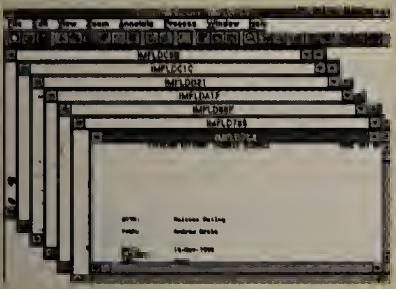
Briefs

Biscom, Inc. *last week rolled out Windows NT Server-based* **fax server software** *for small to midsize businesses. Faxcom/WorkGroup for NT runs as an NT Server application and provides centralized utilities for sending and receiving fax documents. The software supports DOS machines and Windows 3.X, NT and 95. For Windows clients, Faxcom/WorkGroup features a new viewer, which lets users look at multiple fax documents simultaneously and resend altered faxes directly from the desktop. A two-user version can be obtained free from www.biscom.com. Upgrades for five-, 10-, 25- and 100-user packs begin at $795.*

Biscom: (800) 477-2472.



Novell, Inc. *recently announced the resignation of* **Alan Ashton** *from its board of directors. Ashton, who joined Novell when the company acquired* **WordPerfect Corp.** *in 1990, is leaving in the wake of the completed sale of the WordPerfect business to Corel Corp. and the GroupWise 5.0 launch.*

Hewlett-Packard Co. *has integrated* **Open Market, Inc.'s Secure WebServer** *software into HP 3000 machines to create a new fleet of Web servers. Secure WebServer supports the Secure Sockets Layer, providing authentication and encryption functionality for intranets. The server bundle includes a logging function that tracks Web site activity and URLs. It also features script-based access control to ease security settings inside and outside the firewall.*

HP: (800) 752-0900.

Novell's directory service gains support

By Christine Burns
San Jose, Calif.

Novell, Inc. is gaining ground in getting its onetime LAN-based directory accepted as a global service for accessing networked data across wide-area links.

The newest ground covered by Novell lies in Germany. Deutsche Telekom AG recently announced it will become the third public carrier to provide business-level Internet access to corporate customers based on Novell Connect Services (NCS). AT&T and Nippon Telephone & Telegraph of Japan are the other carriers licensing NCS.

NCS — which was announced 18 months ago — employs Novell Directory Services (NDS) to define end-user access to networked services. Carriers use NCS to offer secure Internet and private wide-area access to customers that want to tie sites together or link to partners electronically.

Initially, DT's IntraLink Service will offer customers remote access connectivity between branch offices and corporate sites via ISDN. Additionally, the company will provide customers with network-to-network ties in order to create virtual private LANs, said Guenter Weick, head of the Internet Value Added Services at DT. The company will begin market trials later this month, with commercial availability slated for early 1997.

Industry observers have questioned Novell's ability to push its proprietary directory as a 'Net standard. Despite a sluggish start, the company is right on track with its plan to get NDS widely accepted, according to Tom Arthur, general manager of Novell's Internet Infrastructure Division.

Beveridge and Diamond, P.C. in Washington, D.C. is among the companies using AT&T's NCS-based service. The law firm uses the service to give its clients 24-hour access to legal documents.

"This service saves a lot of time and money because I can link our network to our clients' [nets] and give them real-time access to our libraries and let them work more collaboratively with lawyers here," said David Devcich, manager of information systems. Since access to documents is controlled via NDS, clients are only permitted to view general documents or those related to their case, he added. ■

Find more directory info online.

- Banyan's plans to turn StreetTalk into a global directory
- Netscape's proposals for an LDAP-based global directory
- An Internet Society proposal for a global 'Net directory

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http://www.nwfusion.com

Spectra Logic takes NT track

By John Robinson
Boulder, Colo.

Spectra Logic, Inc., a veteran of the Unix storage wars, next year will launch a two-stage attack on the Windows NT backup market.

The company will begin supporting NT in the spring with Version 4.0 of its Alexandria backup software. The software will back up Unix and NT servers, as well as workstations to server-attached tape libraries, making it ideal for mixed-network operating system environments.

Version 4.0 will also feature an HTML-based interface to ease management and tracking of data during backups.

By summer, the company plans to ship a complete software/hardware solution for NT servers based on Alexandria and its line of tape libraries, which now only supports Unix systems.

Spectra Logic officials said they are taking an NT focus as Microsoft Corp. places more emphasis on SQL Server databases.

The company is also readying Alexandria to support the Network Data Management Protocol, which ensures interoperability between different file servers, storage devices and data management software. The protocol is expected to clear the Internet Engineering Task Force sometime next year. ■

Novell extends Master CNE program

By Christine Burns
Orem, Utah

Novell, Inc. has expanded its Master Certified Novell Engineer (CNE) program to let network administrators specialize in supporting multiplatform networks or managing Internet/intranet connections.

Under its new Client/Network Solutions Track, Novell has worked with IBM and The Santa Cruz Operation, Inc. (SCO) on curriculum that will give existing CNEs the skills to integrate IBM Application System/400 and SCO Unix servers into Novell IntranetWare environments.

Additionally, without the assistance of Microsoft Corp., Novell will offer a track on integrating its Novell Directory Services with Windows NT Servers.

IntranetWare and SCO Unix integration training is being conducted now at both Novell Authorized Education Centers (NAEC) and SCO Authorized Education Centers worldwide. Training for AS/400 integration is available now at select NAECs. NT integration courses will begin early in 1997 at all NEACs.

The new Internet/Intranet Solutions track is designed for engineers who need to incorporate Internet technologies into existing networks. Skills emphasized include managing a TCP/IP infrastructure, building File Transfer Protocol services, installing firewalls and integrating the network operating system with Web servers. Training is available now from NAECs worldwide.

All current CNEs can pursue Master CNE certification. Previously, only CNEs who had already earned NetWare 3.X, NetWare 4.X or GroupWise certification were eligible.

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New tracks to Master CNE

	Client/Network Solutions		
Track	IntranetWare and AS/400 Integration	IntranetWare and Windows NT Integration	IntranetWare and Unix Integration
Core tests	NetWare 4.1 Design and Implementation Fundamentals of Internetworking		
	NetWare for SAA	NetWare TCP/IP	NW TCP/IP, SCO TCP/IP, SCO Open Server Admin or SCO UnixWare System Admin
Target tests	IntranetWare Integration and AS/400	IntranetWare and Windows NT Integration	SCO Open Server ACE for Master CNE or SCO UnixWare for Master CNE
Elective tests	None	Any combination of IntranetWare and NT Integration for 2 credits	None

WIRED WINDOWS

The best and worst of Windows 96

Since this is my last column of the year, I thought I'd stop and reflect on 1996. I've tried to select the best and worst achievements of the year, as well as the one event that was the biggest news story for the Windows net community.

The surprise is that all three are the same: Microsoft discovers the Internet.

After announcing at NetWorld+ Interop in the fall of 1995 that it had no interest in the Internet, Microsoft surprised quite a few people this year by suddenly deciding it really did have an interest. Such a large interest, in fact, that it was worth restructuring the company to accommodate it.

Bill Gates made his best move of the year when he placed Brad Silverberg — who had just finished the impressive launch of Windows 95 — in charge of the Internet division. Silverberg should be nicknamed Midas because everything he touches seems to turn to gold.

Recent surveys show that Internet Explorer is being used on close to 30% of desktops for Internet access — and this doesn't include the recently released versions for Windows 3.1 and the Macintosh. In addition, surveys show something even more surprising: Microsoft's Web server software, Internet Information Server, was used at more than 10% of publicly accessible sites, less than a year after its general release.

Throughout the year, we've seen just about every Microsoft application become Web-enabled or Internet-ready. All of this should culminate next year when Windows 95 — and later, Windows NT — sport the new Active Desktop user interface. I don't see that any other news this year had such a tremendous impact on computing in general, and on network computing in particular.

Dave Kearns

It's also the best news of the year for the many people who — through the use of the dozens of new applications, tools and utilities released by Microsoft — now have their first access to the Internet or greatly enhanced access. It also has led to an explosion in Web sites and content.

Tip of the week

Just in time for Christmas, Hasbro Interactive has released network versions of Battleship and Risk as interactive CD-ROM games for Windows 95 users. Both games have been updated for today's whiz-bang market, but the classic computerized versions are still available and can be played over your hard-wired or dial-up network. Both games should be at your favorite retailer for about $40.

The bad news is that all of this contributed to the exponential rise in demand for Internet access — access that Internet service providers, access providers and infrastructure companies were hard-pressed to handle. Outages affected just about every Internet user at one time or another.

Unfortunately, it will only get worse before it gets better. But maybe that'll be the big news of 1997.

Happy holidays to all. May the new year bring you peace, prosperity and 100% uptime.

Kearns, a former network administrator, is a freelance writer and consultant in Austin, Texas. He can be reached at dkearns@mns.com.

NetworkWorld
TECHNICAL SEMINARS

IPv6
THE NEXT GENERATION FOR TCP/IP INTERNETWORKS

The next generation of Internet Protocol — IPv6 — will significantly impact your TCP/IP network. The Internet explosion now requires new functions that go beyond the capabilities of the current Internet Protocol, or IP. These include enhanced security, support for real time traffic flows and expanded addressing capabilities. The addressing issue has been one of the most significant concerns as it was predicted that the Internet community would run out of available addresses, thus limiting the growth of this critical communication resource.

In late 1990, the Internet Engineering Task Force (IETF) initiated efforts to select a successor to the IP. In late 1993, the IETF formed the Internet Protocol – Next Generation (IPng) working group, which was chartered with investigating the various proposals, and recommending a course of action. The outcome of those efforts produced what is now known as IP version 6 (IPv6), which is currently being implemented by many vendors.

Perhaps more importantly, IP is the foundation of the TCP/IP protocol suite. Therefore if IP is revised, other protocols must be changed as well. The significance of this protocol revision extends to LANs, MAN and WAN transmission systems, as well as the upper layer protocols and application programming interfaces.

Whether you are a network manager, designer or software developer, this seminar, taught by internetworking expert Mark Miller, will provide you with information on the widespread ramifications of this new protocol. You will learn how to effectively plan and implement a successful, orderly transition.

12 TOPICS YOU DON'T WANT TO MISS!

1. Learn how the implementation of IPv6 will allow continued expansion of the global Internet
2. Explore the effects of IPv6 on other elements of your internet or intranet architecture
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4. Discover key features of IPv6, including larger addresses and security
5. Learn details of the proposed IPng solutions: CATNIP, TUBA and SIPP
6. Understand the key functional and protocol enhancements incorporated into IPv6
7. Analyze the formats of the IPv6 packet header, Extension headers, ICMPv6 messages and Neighbor Discover messages, and others.
8. Gain detailed insights into how the IPv6 transition will affect other protocols, such as Ethernet, token ring, RIP and OSPF
9. Learn how to strategically plan your transition from IPv4 to IPv6
10. Learn how leading vendors such as Bay Networks, Cisco Systems, Digital, FTP Software, Sun and others are implementing IPv6
11. Learn about the 6Bone — a worldwide IPv6 network
12. Discover how to obtain public domain sources of further information on IPv6

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Enterprise Network Management
Understanding SNMP, SNMPv2 and RMON

With the explosive growth of enterprise internetworks, the need for integrated network management systems to help simplify management operations has never been greater. Today's enterprise network management systems need to manage thousands of elements — from the hardware devices all the way to the applications and processes running on these networks.

SNMP (Simple Network Management Protocol) has become the de facto standard for end-to-end enterprise network management. Recent enhancements to the SNMP-based technology, including SNMPv2, RMON2 and Web-based management tools, improve this popular system. With those enhancements, however, come additional challenges for the network manager.

This one-day, information-packed seminar, taught by internetworking expert Mark Miller, will help you understand the elements of an SNMP-based network management system, how to implement SNMP with your internetwork, plus the various enhancements such as the new message formats and improved error codes provided with SNMP version 2. You will learn about recent enhancements to the Remote Monitoring (RMON) network management architecture, known as RMON2, and the advantages of implementing RMON throughout your internetwork. In addition, you will see how SNMP is being used to manage broadband networks, including frame relay, SMDS and ATM.

You will also be introduced to the next generation of network management: Web-based tools that integrate SNMP and browser technology. This new technology consists of three components: network management software which runs on a Web server, proxy agents which operate on the managed devices, providing updates to the Web server, and a browser-equipped workstation that can access those management details from any location within the enterprise.

ATTENDING THIS SEMINAR WILL HELP YOU . . .

1. Understand the Agent/Manager model of network management
2. Compare and contrast the ISO, IEEE, DMTF and Internet network management architectures
3. Discover the next-generation architecture of enterprise management tools: the Web-based managers and agents
4. Understand the key components of the Web-based Enterprise Management: the HyperMedia Management Schema (HMMS), the HyperMedia Object Manager (HMOM) and the HyperMedia Management Protocol (HMMP)
5. Learn the details of the key elements of the Internet Network Management framework: the SMI, the MIB and the SNMP
6. Discover how existing Web-based enterprise managers and existing SNMP-based devices can be integrated into a cohesive system
7. Understand the enhancements found in SNMPv2, plus the proposed security enhancements: SNMPv2u and SNMPv2*
8. Survey the key elements of Abstract Syntax Notation One (ASN.1), the language used to define SNMP message formats
9. Understand the key differences between the RMON and RMON2 standards for remote management of the enterprise
10. Consider strategies for the coexistence of SNMP version 2 with existing SNMP version 1 systems

DATES & LOCATIONS

IPv6 SEMINAR	CITY	SNMP SEMINAR
3/4/97	Denver, CO	3/5/97
3/11/97	Dallas, TX	3/12/97
3/31/97	Washington, DC	4/1/97
4/8/97	New York, NY	4/9/97
4/23/97	Boston, MA	4/24/97
5/13/97	Atlanta, GA	5/14/97
5/28/97	Chicago, IL	5/29/97
6/10/97	San Francisco, CA	6/11/97
6/17/97	Irvine, CA	6/18/97
6/24/97	Philadelphia, PA	6/25/97

Register and You Will Receive . . .

- *Comprehensive seminar workbook*
- *Copy of* Managing Internetworks with SNMP *by Mark A. Miller*
- *Four exclusive protocol reference guides: SNMPv1, SNMPv2, RMON and RMON2 MIBs*
- *Valuable course diskette containing reference documentation and standards for SNMP and related technologies*
- *Luncheon and break refreshments*
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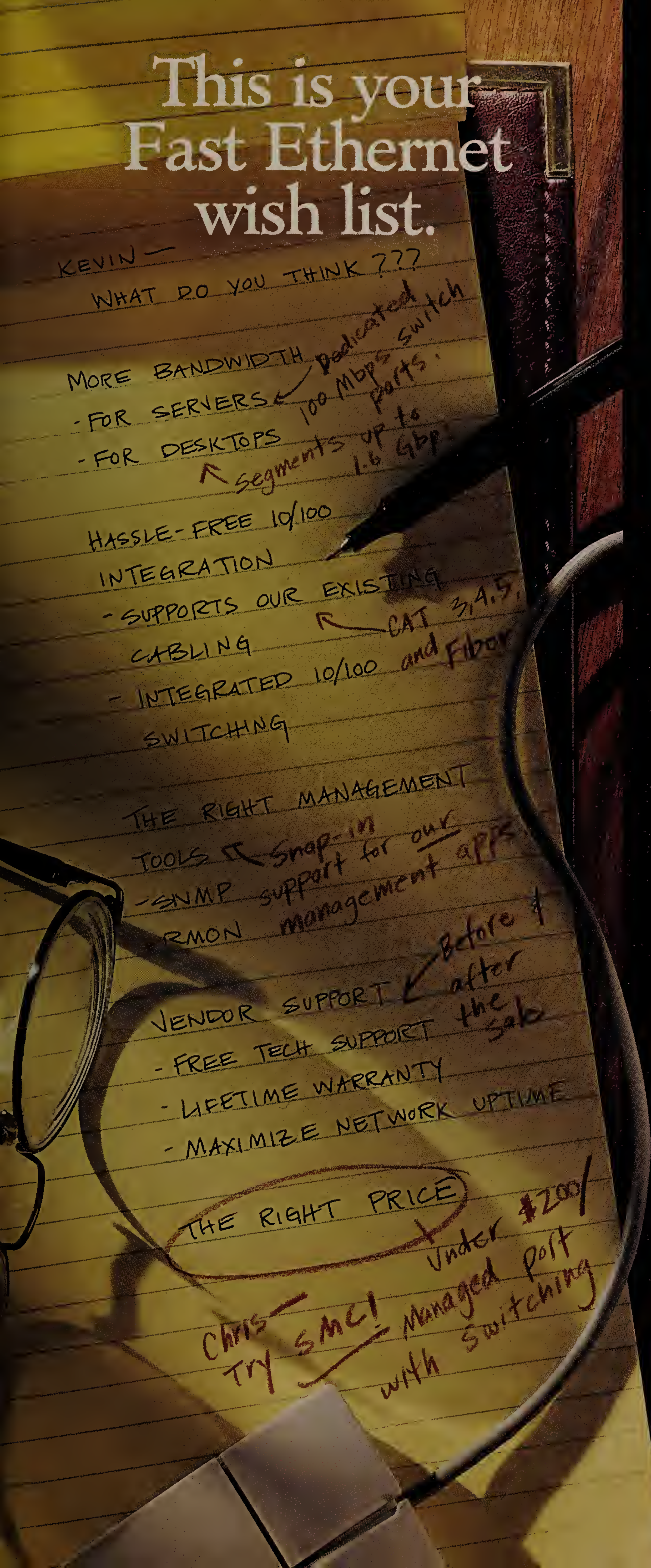
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Circle Reader Service #**9**

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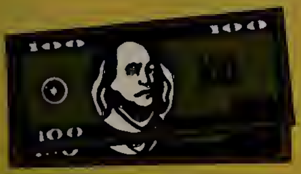

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Circle Reader Service #5

NETWORK DESIGN

Rule reversal: Old 80/20 LAN traffic model is getting turned on its head

New traffic patterns are placing bandwidth burden on corporate backbone networks.

By Jodi Cohen

If you still think the 80/20 rule holds true for LAN traffic, think again.

The longtime network model — where 80% of traffic remains local to the workgroup and 20% traverses the campus backbone — no longer applies to most companies. There has been an almost total flip-flop in LAN traffic patterns to produce what some are now calling the inverse 80/20 rule, or 20/80 rule.

This traffic flow shift — mostly due to increased server centralization — is putting big bandwidth pressure on LAN backbones, according to analysts and users.

"The old 80/20 rule has been overturned as powerful servers move to the glass house and end users take advantage of geographically dispersed intranet and Internet resources," said Trudy Barker, an analyst at Dataquest, Inc., a market research firm in San Jose, Calif.

"Existing backbones, designed for shared Ethernet to the desktop and the old 80/20 traffic patterns, are going to melt unless upgraded," Barker said.

A network manager at the University of Southern California in Los Angeles agreed.

"Traffic patterns have definitely changed because of server farms," said James Wiedel, director of networking at the university's computer services department.

"Most of my servers are located in one spot, whereas before they were either distributed or everybody had their own computer right there with them," he said. "So now we need bigger, fatter backbone pipes."

He's not alone. Dataquest expects many companies to upgrade their backbone networks and predicts there will be a huge backbone bandwidth uptick over the next five years (see graphic, far right).

Front and center

Why the sudden shift to a centralized server model? Reasons include:

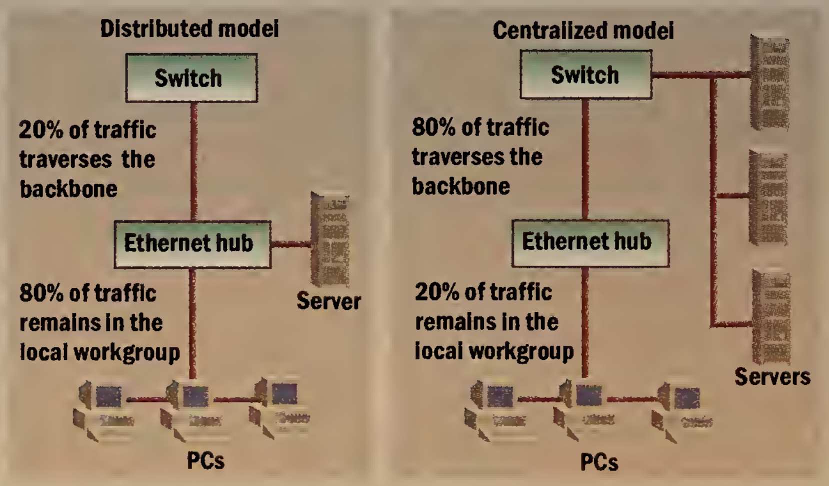
- Simplifying server management. It's much easier to manage a pool of servers in the same room than a smattering of them across a company.
- The emergence of more powerful desktop computers that make end users less reliant on workgroup servers.
- Increases in server processing power and the emergence of Windows NT clustering technology, which combined will better equip servers to handle large loads from a central site.
- With increased deployment of thin clients expected, powerful central servers will be needed to support shared applications.

Carnival's *Masseria is centralizing servers in the data center, which is driving the need for bigger backbone bandwidth.*

"By centralizing resources, the network is easier to manage, administer, back up and keep secure," said Skip MacAskill, senior research analyst at Gartner Group, Inc., a consultancy based in Stamford, Conn. "But by centralizing, it absolutely mandates a major upgrade to the backbone."

BREAKING THE BACKBONE

The old 80/20 LAN traffic rule – where 80% of traffic remains local to the workgroup and 20% traverses the backbone – has been turned upside down. The traffic flow shift, mostly due to server centralization, is creating huge bandwidth needs for the backbone.


Distributed model
Switch
20% of traffic traverses the backbone
Ethernet hub
Server
80% of traffic remains in the local workgroup
PCs
Centralized model
Switch
80% of traffic traverses the backbone
Ethernet hub
20% of traffic remains in the local workgroup
Servers
PCs

Previously, most net managers designed networks according to a distributed model where computing resources were dispersed throughout the network and physically collocated with the group that used them. These distributed environments were focused less on large backbone bandwidth than on bandwidth into individual servers, MacAskill said. Backbones in distributed networks are commonly Ethernet or token ring, with some FDDI running at a low utilization rate.

But dispersing net gear around the LAN caused many net managers to lose control of the network. So now more of them are opting to centralize resources as a way to get their arms back around the network.

"Our strategy is to locate all the servers in the data center, and that's the way we've designed our network," said John Masseria, manager of systems support and information systems at Carnival Cruise Lines, Inc. in Miami.

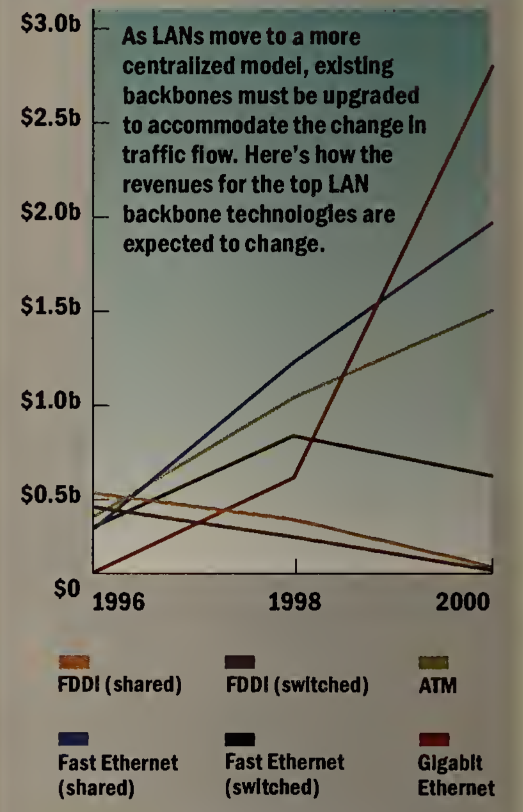
"My traffic is aggregating back to my backbone because that's where my servers are," he said.

Server centralization, however, does not really optimize the network for all end users, MacAskill said.

"By centralizing, you've optimized your network essentially for business and management reasons, which certainly has its benefits," he said. "But centralizing devices creates questions like: How will end users access that environment? How can you make sure that you have enough bandwidth to meet all the end-user needs and give priority to those applications that have a time-sensitive nature?"

Part of the answer — which should come as no surprise — is to build higher capacity backbones.

THE NEED FOR SPEED



As LANs move to a more centralized model, existing backbones must be upgraded to accommodate the change in traffic flow. Here's how the revenues for the top LAN backbone technologies are expected to change.

SOURCE: DATAQUEST, SAN JOSE, CALIF.

The more the merrier

That's why fast LAN technologies such as Fast Ethernet, Gigabit Ethernet and ATM are attracting so much attention of late.

"The whole traffic pattern is changing on us," said Tony Lee, chairman of the Gigabit Ethernet Alliance and a Sun Microsystems, Inc. senior product manager.

"That's why when it comes to the LAN backbone, the more bandwidth the merrier," he said.

Lee expects customers will throw as much bandwidth at the problem as possible, and will likely choose Gigabit Ethernet for a bandwidth boost in data-intensive networks.

Wiedel agreed that centralization creates huge needs for bandwidth.

"We've been running FDDI for years in our backbone, and we're now looking to provide multiple full-duplex links there to beef it up," he said. "In the future, it looks like we'll be going with Gigabit Ethernet, since big pipes are really the key."

But the pitfall that customers can easily fall into is overprovisioning — throwing tons of bandwidth at the data center.

"It's not just about bandwidth; it's about managing that bandwidth," MacAskill said.

He pointed out that the real challenge is for net managers to ensure they can direct the bandwidth to the applications and end users that need it — when they need it and for as long as they need it.

"Bad network design involves throwing bandwidth at a problem and hoping enough sticks to keep the network up," MacAskill said. "It's easy to fall into that because it's relatively inexpensive to do on the LAN side — and will probably solve the problem in the short term — but it's not doing anything but masking the underlying design issue."

That's where high-speed LAN technologies such as ATM come into play. ATM, unlike 100M and 1G bit/sec Ethernet, offers a prioritization scheme and can guarantee quality-of-service parameters. Because of those features, many analysts think ATM will win the LAN backbone wars.

Turned upside down?

No matter which technology customers choose, it is clear that LAN backbone upgrades are in order to accommodate the recent shift in LAN traffic. But has the 80/20 rule really been reversed?

MacAskill thinks that it's well on its way.

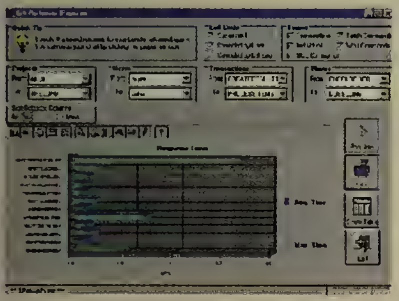
"We're getting to the point now that you're looking at a 35/65 split — where 35% of traffic stays local and 65% goes out over the backbone — and it will probably get pretty close to a total reversal," he said. ■

Client/Server Applications

Covering: Databases • Messaging • Groupware
Conferencing • Imaging • Multimedia • Development

Briefs

Segue Software, Inc. *has released QA Performer, a multi-platform, graphical software program that* **simulates end-user activity** *on a client/server application. By varying the number of users and their actions, software developers can test application performance. It lets developers create test loads early in the development cycle. It's available now on Windows platforms and OS/2, and works with any Open Database Connectivity database.*



Pricing begins at $10,000.

Segue: (800) 287-1329.

Oberon Software, Inc. *has released Prospero 1.5, a* **component software tool** *that lets developers interconnect a wide range of existing applications to share information over the net. The database modules have been improved with features, including transaction control. Several new modules let customers interconnect third-party applications. Available for all Windows platforms, the Prospero Professional Developer version costs $2,395. Specialized modules for applications start at $99.*

Oberon: (617) 494-0990.

Ipswitch, Inc. *of Lexington, Mass., last week introduced* **Web Messaging,** *an add-on to IMail Server for Windows NT that lets remote users access mail using any Web browser, a Post Office Protocol 3 logon and a password. An enhanced version lets the server administrator display advertising on the Web Messaging interface. The standard and enhanced versions cost $195 and $395 per server, respectively.*

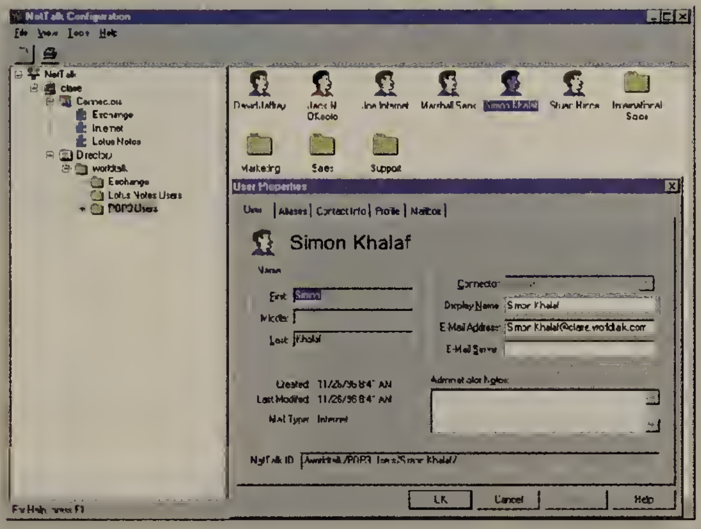
Ipswitch: (617) 676-5700.

PRODUCT SPOTLIGHT

WORLDTALK HOPES TO BE HEARD

Worldtalk Corp. of Santa Clara, Calif., last week released an intranet messaging and directory server called NetTalk. Promising a host of directory synchronization and security features, NetTalk is targeted at small to midsize operations. Included are POP3/SMTP E-mail services, Lightweight Directory Access Protocol services and connectors to proprietary groupware applications. Expected to ship in the first half of 1997, NetTalk's entry price is $1,995.

Worldtalk: (408) 567-1500



Simon Khalaf

JetForm/Delrina hybrid readies for takeoff

By Paul McNamara
Ottawa

Three months after gobbling up its major competitor, JetForm Corp. last week announced a 12- to 18-month plan for digesting Delrina Group's electronic forms technology, sparing both customer bases serious indigestion.

Analyst and user reaction suggests JetForm may have hit on the right recipe for accomplishing that tricky task.

Now by far the dominant player in a $125-million-a-year electronic forms industry, JetForm sees the Delrina integration as rolling out three stages:

- Early next year, users of Delrina's FormFlow 2.1 will be able to submit forms for processing via JetForm Central.
- By mid-1997, the perceived strengths of FormFlow are scheduled to be incorporated into JetForm products such as JetForm Filler and JetForm FillerPro.
- What JetForm calls a best-of-breed product suite is expected to be delivered by early 1998, combining the top features of both lines.

The consolidation of the products will bring together JetForm's strength on the server side and Delrina's solid client, said Steve Weismann, an analyst with Kinetic Research of Waltham, Mass.

The consolidation of the products will bring together JetForm's strength on the server side and Delrina's solid client, Weismann said.

JetForm officials last week expressed confidence in their ability to keep all parties satisfied during the unification process. And they are not alone in that belief.

"They've got every economic reason in the world to be supportive of both systems," said Tony Jones, director of forms management at Anheuser-Busch Companies, Inc., whose operation installed Delrina's FormFlow only six months ago.

"Over time, that's a positive move because there are a lot of features in JetForm that they'll be able to merge with Delrina FormFlow," he said. "You migrate the two into one, and I think you'll have a powerful piece of software."

©JetForm: (613) 230-3676.

'Net applications

Powersoft muscles into the Java market

By John Cox
New York

Sybase, Inc.'s Powersoft division last week unveiled its graphical tool set for building Java applications.

The new Starbuck product, appearing here at Fall Internet World 96, is designed to bring the still-immature Java programming world a set of advanced application features borrowed from client/server development.

The goal is to help developers build server-based, mainline business applications in Java and link these easily with networked databases, according to Tina Pitts, technical marketing specialist with Powersoft.

Powersoft gives Java developers a way to amalgamate and run all the different elements that a typical Web application comprises — not only Java code, but JavaScript and HTML files.

The tool set features the same graphical, drag-and-drop user interface that Powersoft first deployed earlier this year in its Optima C++ tool set. With a set of mouse clicks, developers can drag and drop software components from a palette onto an editing screen.

Starbuck then generates Java code, which can be deployed over the World-Wide Web to run on clients or servers. The applications comply with the JavaBeans component specification. Pitts said the Java components can also interoperate with those built as ActiveX Controls and embedded on an HTML page.

The product comes with a set of reusable components, which are Java applications. Some components handle a range of communications. One accesses databases through the Java Database Connectivity (JDBC) interface. Unlike Microsoft Corp.'s Open Database Connectivity interface, JDBC does not require code to be installed on the client.

Other components make use of Microsoft's Web server APIs, called ISAPI, and Netscape Communications Corp.'s, called NSAPI.

Also included are "data-aware bound controls," which let developers quickly connect boxes or fields on an HTML page with specific database tables on server databases.

Others handle session management — in effect, maintaining an interactive conversation between the browser client and the Web server.

To suit Starbuck for team-oriented development projects, Powersoft created links to several popular, third-party software configuration management tools.

In addition, Powersoft gives Java developers a way to amalgamate and run all the different elements that a typical Web application comprises — not only Java code, but JavaScript and HTML files. Other tools often only let developers view code, and ignore HTML and scripts.

A test version of Starbuck is available now over the Web at www.powersoft.com.

Read up on other graphical Java builders.

Enter the number to the right in the DocFinder box on the home page.

FIND IT ON FUSION
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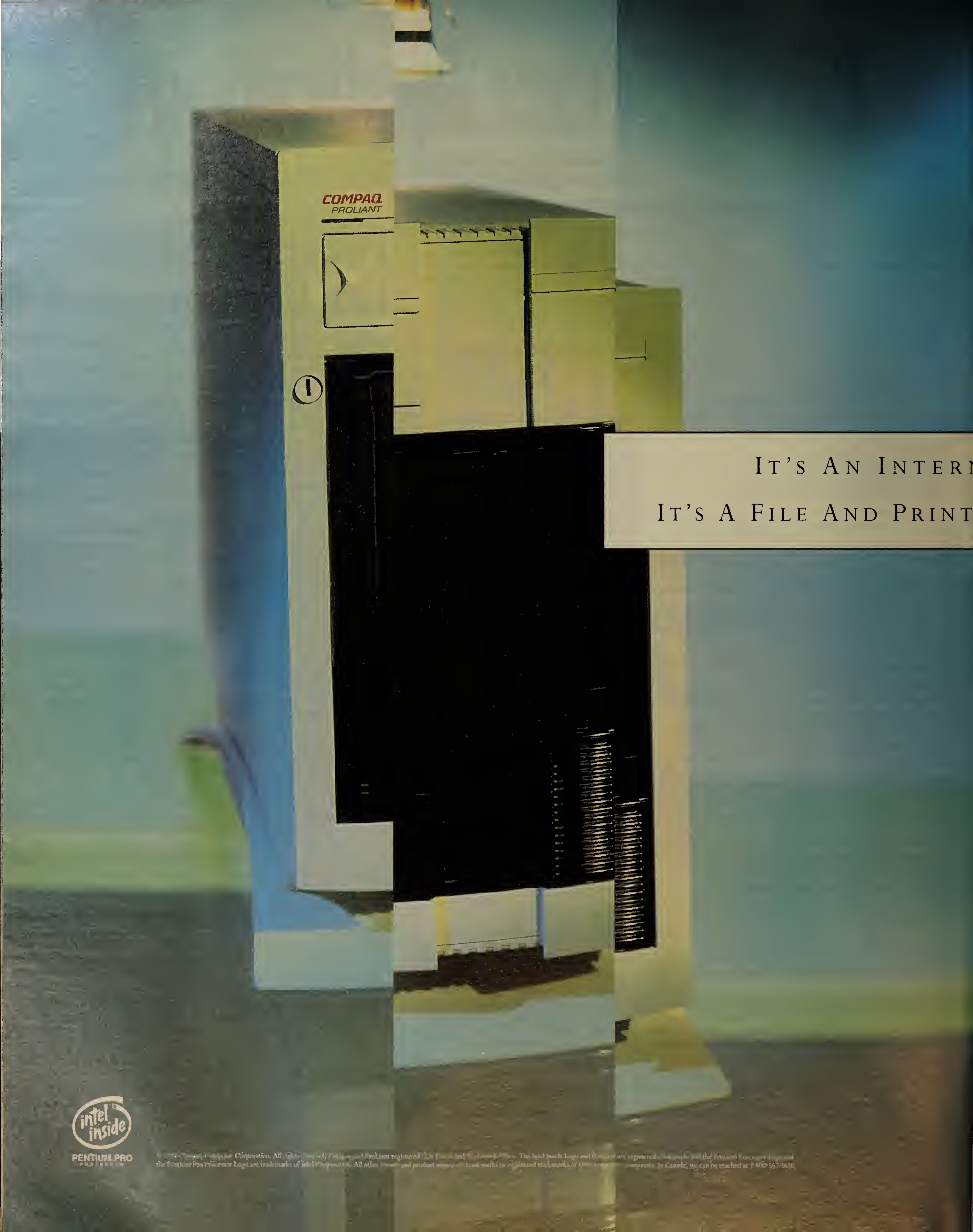
Network World Fusion
http://www.nwfusion.com

The final product is expected to be released by mid-1997. Powersoft has not yet announced pricing and packaging for the Starbuck product.

©Powersoft: (800) 265-4555.



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ERVER. CAN AN IDENTITY CRISIS BE A VIRTUE?

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COMPAQ

Has It Changed Your Life Yet?

SHARED LOGIC

Infomercials on the Internet

The product launch of Vayu Web 500 this week took the Internet world by surprise. Who expected a software start-up to suddenly leap onto center stage with full-page ads in *The Wall Street Journal, Business Week* and a host of trade magazines, boasting that it had "re-invented the Internet?"

I knew about the launch early because my company has been beta-testing Vayu Web, Inc.'s artificially intelligent Web site enhancement software for several months. We're already using it to automate our sales and marketing efforts, and it has been so effective that we have completely reorganized our sales and marketing around the technology.

But I was shocked at the scope of the launch: Vayu Web's home page (www.vayuweb.com) is pumping over 300M bits of bandwidth nationwide over five T-3-enabled sites.

Andy Jurkevics, one of the company's senior analysts, said Vayu Web is set up to handle about one million visitors a day. Why the rush to see this technology? Because this product speeds up Web sites by applying streaming concepts to the downloading of HTML pages.

Vayu Web 500 is the first product to significantly reduce waiting time on the Web using artificial intelligence (AI). By preloading pages that are part of a preformatted infomercial, the user is presented with a continuous series of screens, eliminating the frustrating minutes that most Web users spend waiting for pages to download. The AI component calculates exactly how much information can be downloaded based on the user's configuration.

In my company's case, we decided to reengineer our entire business model based on Vayu Web 500. This month, we are pulling our sales force off the street and giving the employees jobs in our training and consulting departments. All of our sales are now conducted over the Web using the automated presentation formats provided by Vayu Web 500.

Marc Myers

From a business point of view, Vayu Web 500 is an ideal sales tool. Customers are "driven" through a Vayu Web presentation and shown what the seller wants them to see. It puts the seller in control of the content, much in the style of television. Vayu Web 500 accomplishes this goal by helping you to initially set up a site using the Virtual Design Studio.

The studio lets Web builders create time-sequenced multimedia presentations that are then handled by client-side Java applets. Using AI advisors, the Virtual Design Studio lets Web builders browse a pool of existing pages and assemble them into presentations that are optimized based on an end user's Internet connection throughput rates.

Vayu Web is among the first companies to produce tools for selling goods and services over the 'Net. The firm has identified and addressed the primary problem with the Web: Practically no one is making money except for the service providers. A product that smoothes the delivery of the seller's message, no matter what the end user's capacity, and which completely controls the viewer's experience is a dream come true for firms that want to make money on the Web.

Myers is chief executive officer of Client/Server Connection, Ltd., a New York-based software development company. He can be reached via the Internet at mmyers@cscl.com.

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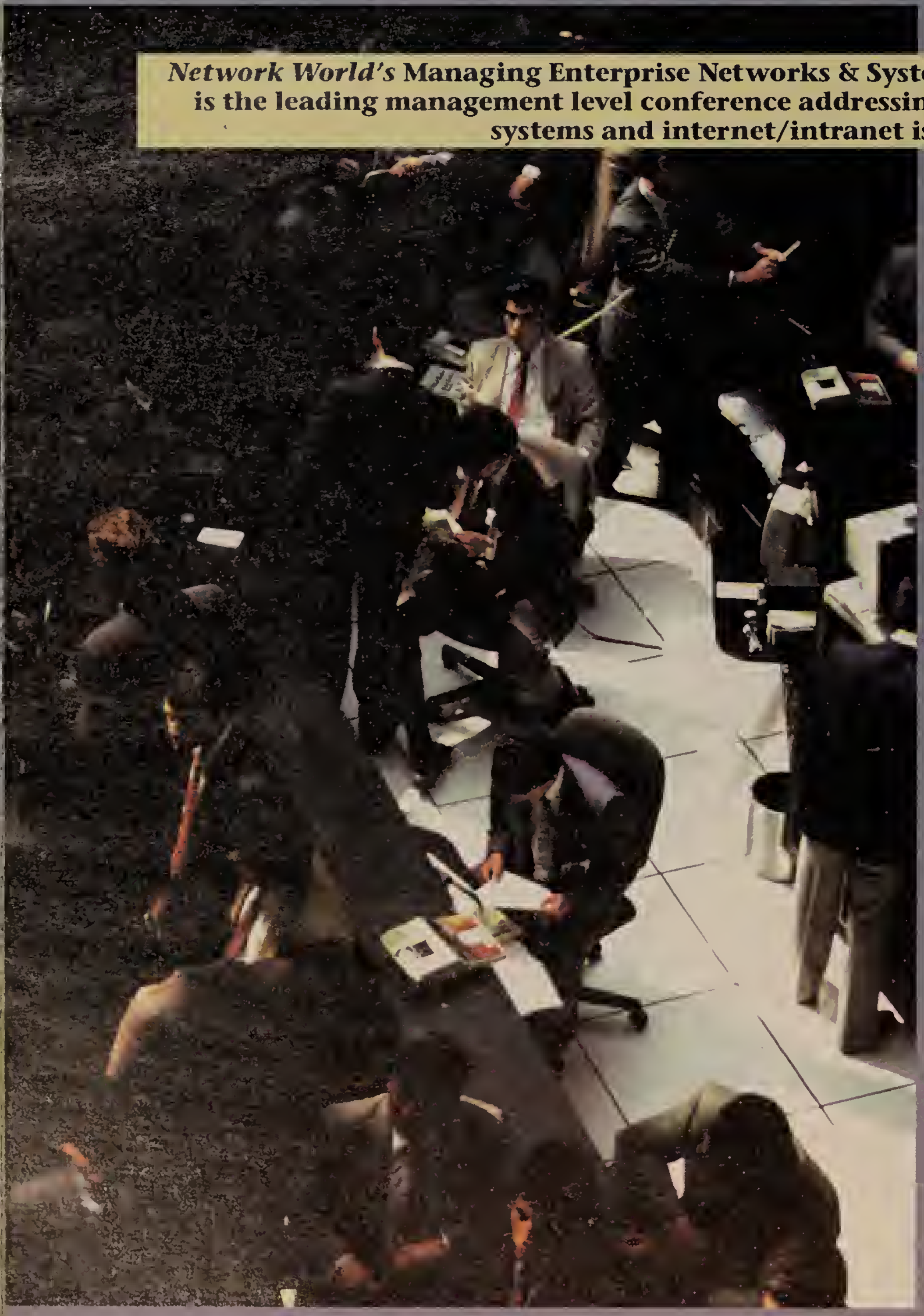

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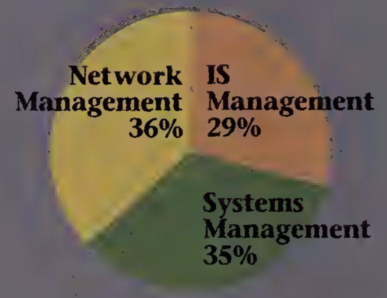

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Briefs

■ *Start-up* **inCommon, Inc.** *of San Mateo, Calif., this week will launch itself with software for* **broadcasting news** *over the Internet. The company's Downtown offering consists of Windows NT and Unix servers that let content providers send out a stream of data over TCP/IP nets and a client that lets end users select multiple "channels" in an interface similar to the Windows 95 task bar. The server lets users track incoming requests and set up profiles for end users.*

Pricing starts at $1 per end user; the client is free.

inCommon: (415) 345-5432.

■ **White Pine Software, Inc.** *of Nashua, N.H., has released a new version of Reflector, server software designed to allow* **real-time group conferencing** *and live broadcasting over the Internet and corporate intranets. Reflector 2.1 includes a graphical user interface and multicast features. Pricing starts at $995 for a 10-user license.*

White Pine Software: (603) 886-9050.

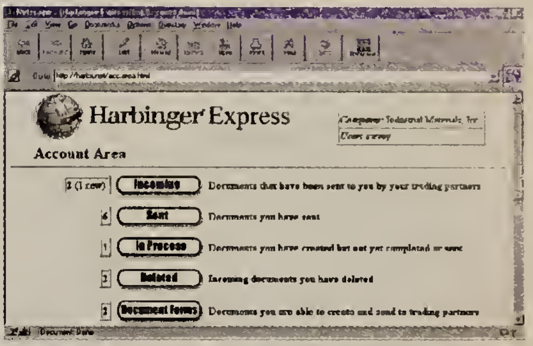
■ **Claris Corp.** *of Santa Clara, Calif., last week at Fall Internet World 96 in New York announced availability of Home Page 2.0, the updated version of its* **Web authoring software** *for Macintosh and Windows 95 and NT. New features include built-in site publishing, with automatic consolidation of image files and single-step uploading to a designated server; spell checking; drag-and-drop table creation; and HTML editing enhancements such as syntax coloring.*

Estimated retail price of Home Page 2.0 is $99. The shrink-wrapped product will be available through resellers in January.

Claris: (408) 987-7000.

EDI to crawl over the Web

Harbinger, Premenos offer competing options for conducting electronic commerce.



Account Area

2 (1 new) **Incoming** Documents that have been sent to you by your trading partners

6 **Sent** Documents you have sent

1 **In Process** Documents you have created but not yet completed or sent

2 **Deleted** Incoming documents you have deleted

2 **Document forms** Documents you are able to create and send to trading partners

With Harbinger's *new service, Harbinger Express, companies can send and retrieve EDI documents.*

By Ellen Messmer

If you are looking to send electronic data interchange transactions over the Internet, the choice may not be easy. Harbinger Corp. and Premenos Corp. last week proposed two different ways to do it.

Harbinger will announce a Web-based service that enables large corporations to receive HTML-based purchase orders and the like from smaller firms that traditionally have not used EDI software and value-added network (VAN) services.

Separately, Premenos will unveil a beta version of client/server software called Templar WebDox that lets companies send EDI-formatted messages using Secure HTTP or Secure Sockets Layer.

The WebDox Remote client software can make use of HTML or Java applications, and is expected to cost about $299 when it ships next quarter. The WebDox Server, which tracks incoming and outgoing EDI forms among trading partners, will cost between $50,000 and $100,000, according to Gerry Diamond, Premenos senior vice president.

Learn more about EDI as well as the new software and services offered by Harbinger and Premenos.

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NetworkWorld Fusion http://www.nwfusion.com

EDI management

The Premenos approach to EDI on the 'Net presupposes that businesses will opt to manage EDI transactions on their own, avoiding VAN service costs.

Conversely, Harbinger believes most companies will want to continue using the decade-old model set by the VANs, which provides considerable software assistance and troubleshooting for subscribers.

In the Harbinger Express service, when small companies fill out HTML-based purchase forms and the like, they are converted behind the Harbinger Web site into EDI-formatted messages that are shuttled off over its VAN.

"This is just like a VAN, and everything you do is archived," said Tom Lenahan, Harbinger marketing vice president, when asked about the company's EDI service for the Web.

He acknowledged Harbinger does make the bulk of its revenue from its VAN service rather than its software.

Start-up fees

Lenahan said Harbinger does not plan to charge the large corporations to set up their EDI forms on the Harbinger site, but small companies that send EDI traffic to big firms will have to pay a $495 start-up fee and $29.95 for every 15 documents they send each month, plus $1.50 for each additional document.

Lenahan added that Texas Instruments, Inc., a large EDI user, is currently beta-testing the service with its smaller trading partners.

©Harbinger: (404) 841-4334; Premenos: (510) 602-2000.

Vivo lets its enhanced video publishing/production tool roll

Also, Starlight updates Solaris version of video product.

By Carol Sliwa
and Doug Barney
New York

The image is bigger, and the audio quality promises to be better, in the new version of Vivo Software, Inc.'s standards-based Web video publishing/production tool launched last week at Fall Internet World 96 here.

Another key new feature in VivoActive Producer 2.0 is the production workflow automation capability that lets Webmasters preprogram settings for common types of streaming content to help expedite production.

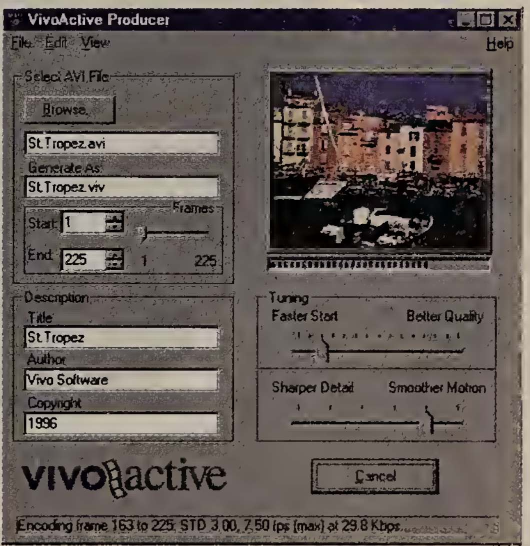
But one customer said the ability to present larger images is the big attraction in the new edition.

"We're a developer for HBO's Web site, so we do a lot of movie clips they provide online, and the main complaint of people has been that the movies are too small," said Michel Maitenaz, creative director of Reset, Inc., based here, who uses VivoActive to create those video snippets.

In addition to announcing the new version of VivoActive Producer, the Waltham, Mass.-based company also outlined its strategy for easing production of Web pages that contain streaming video clips that can be played over low bandwidth.

Plans include:

- Adapting VivoActive Producer 2.0 to work with servers from Microsoft Corp., Netscape Communications Corp. and Progressive Networks, Inc. The video tool also will be enhanced to include support for Microsoft's ActiveX, Netscape's Open Network Environment and Apple Computer, Inc.'s OpenDoc.
- Integrating the new product with Adobe Systems, Inc.'s Premiere video editing tool.
- Supporting Informix Software, Inc.'s Universal Server.



Select AVI File: St.Tropez.avi

Generate As: St.Tropez.viv

Start: 1

End: 225

Description

Title: St.Tropez

Author: Vivo Software

Copyright: 1996

Encoding frame 163 to 225; STD 3.00, 7.50 fps (max) at 29.8 Kbps...

The VivoActive Producer 2.0 *tool includes workflow automation features and productivity enhancements that speed the process of converting digital video into streaming media content embedded in HTML pages.*

VivoActive Producer 2.0, due for general release in January, will sell for $995.

Starlight shines on Solaris

Separately, Starlight Networks has revamped its video server for SunSoft, Inc.'s Solaris operating system.

StarWorks 3.0 for Solaris is aimed at delivering broadcast-quality video over corporate intranets.

The server can play video streams at up to 200M bit/sec. The company's Windows NT version can only play at 100M bit/sec, said Tanya Candia, vice president of marketing. Each StarWorks server can hold up to 250G bytes of data.

Because Starlight focuses on high-quality video, its server is not appropriate for the Internet, where bandwidth cannot be fully guaranteed.

StarWorks 3.0 for Solaris is available now, and pricing starts at $6,995 for the 15M bit/sec model. The 100M bit/sec version costs $32,995.

©Vivo: (800) 848-6411; Starlight: (415) 967-2774.

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Go to ***www.proteon.com/mktg/dare.htm*** *and see how GlobeTrotter stacks up to the competition on price, performance and security! Or call* ***800-830-1300, ext. 101*** *and we'll fax or email you the information.*

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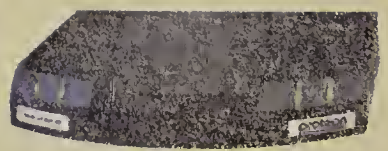
GlobeTrotter: you could buy a more complicated Internet/Intranet access device. But then you'd have to use it.

proteon network with the pro

GlobeTrotter



The GlobeTrotter ***Series 60/62*** *Internet/Intranet Remote Access Routers. For those looking for easy IP dial-up, Frame Relay, or leased line connections, or IP, IPX, Appletalk routing or bridging.*

The GlobeTrotter ***Series 70/72*** *Internet/Intranet Remote Access Routers. For those looking for easy IP dial-up ISDN connections, or IP, IPX, Appletalk routing or bridging over ISDN.*

The GlobeTrotter ***Series 100*** *Internet/Intranet Remote Access Hub Router. For those looking for easy small office, multi-protocol hub/router connections.*

GlobeTrotter Product Page
www.proteon.com/
mktg/gtfam.htm

Internet GlobeTrotter network access

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NET INSIDER

The days of future past

The Dec. 6 issue of *The Wall Street Journal* had a story announcing the demise of Tele-TV, a joint venture of Bell Atlantic Corp., NYNEX Corp. and Pacific Telesis Group, which have collectively spent a few hundred million dollars on it.

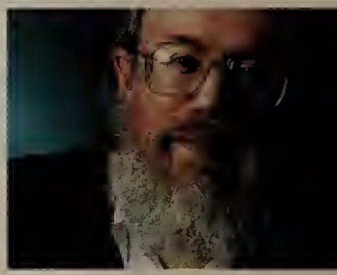
The Bell-ettes created Tele-TV in 1994 when *Time, Newsweek* and most of the technical press were lusting after the National (and Global) Information Infrastructure (NII) — a grand new network infrastructure that was going to be couch-potato heaven. It would let you instantly call up movies you never knew you wanted to see — "Rocky 34" one night, "Terminator 17" the next.

Tele-TV was to create the technology and programming for interactive television. It was formed when the information superhighway was going to be fun. The idea that people and businesses might want to use it for communication or commerce seemed far from the best and brightest minds of the traditional telecom industry.

But something happened to the dream, and that something was the Internet.

The traditional networking and telecommunications people dismissed the Internet as some slightly suspect government toy that could never be used for anything real. Those of us who use the 'Net for productive work day after day must be suffering some sort of mass hypnosis. If it is all a delusion, it is a grand one.

There were other reasons that led to the folding of Tele-TV. *The Wall Street Journal* mentions the difficulty the cable TV industry found in trying to develop the technology to directly compete with the telephone companies on voice service, removing a reason for the phone companies to try and confront the cable companies on their own turf. In addition, the telecommunications reform act of 1996 will allow the Bells to enter the market for long-distance phone calls, something they think they know how to do and that seems more likely to generate a profit than video on demand.



Scott Bradner

But the underlying reason is the traditional telecommunications view of the future and its relationship to what the Internet represents. The traditional view is that the future is represented by the concept of centralized content. Broadcast and CATV are what the traditionalists see as the future. In this future, large firms will provide resources to which all users will flock, like pigeons in the park to someone spreading bread crumbs. The view is of few providers serving many customers.

But this is not what the Internet is. The Internet is many providers serving many customers. The customers will still pay for much of what they get, but the revenue will not be for just a few megacorporations. For example, the 'Net enables a small company employing a few people to become one of largest bookstores — in terms of titles available — in the world. On the Internet, no one knows you are puny.

This fundamentally different understanding of the future will continue to create more Tele-TVs, but the Internet will continue to grow in spite of them.

Disclaimer: Although Harvard uses the many to many for many (many students, many teachers, many dollars), it has no opinion on NII paradigms.

Bradner is a consultant with Harvard University's Office of Information Technology. He can be reached via the Internet at sob@harvard.edu.

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Technology Update

Keeping Up with Network Technologies and Standards

NUTTER'S NETWORK HELP DESK

Ron Nutter, a Master Certified Novell Engineer and Groupware CNE in the Lexington, Ky., area, tracks down the answers to your questions. Call (800) 622-1108, Ext. 476, or send your questions to rnutter@world.std.com.

In an instructional lab, we have a 10M bit/sec Ethernet segment over which we mainly run TCP/IP in Ethernet II frames. We also run Novell, Inc.'s IPX protocol over 802.2 frames to a NetWare 4.01 server. Both work well, even simultaneously.

We recently added Digital Equipment Corp.'s RoamAbout wireless LAN system, which lets mobile PC users access the wired LAN over a radio data link. This works fine for TCP/IP but not with NetWare.

When we log on, the system "runs away," regardless of whether the client needs to submit a password. A protocol analyzer shows a continuous flood of frames, presumably because the system is stuck in a loop. We'd appreciate your advice.

Via the Internet

I have a number of suggestions:

- Download the latest VLMKTx.EXE files from Novell's Web site (http://www.novell.com), and make sure you have the latest ODI drivers running on the workstation.
- Try loading just the ipxodi.com driver and not the tcpip.com driver to see if the runaway problem persists. By the same token, try running just the IPX protocol on the server.
- Look at the patlst.txt file on Novell's Web site to make sure you have the latest LOGIN.EXE installed on the server. The server could possibly have a LAN driver problem, so try applying LANDR8.EXE.
- Ask Digital's technical support group if you have the newest WVLAN05 driver, and if the company is aware of any problems with the product. There might be a firmware update for the wireless system that could help address the problem.
- Examine the flow of the frames your protocol analyzer is showing to see what looks different on the exchanges between the times you are having a problem and when only the IPX protocol is present.
- Try using the 802.3 Ethernet frame type. Perhaps the problem is related to the 802.2 frame type.

Gigabit Ethernet wares, and why

By Steven Strom

Gigabit Ethernet couldn't happen at a better time. Building on the proliferation of switched 10M and 100M bit/sec Ethernet devices, 1G bit/sec Ethernet is an elegant and timely next step.

But Gigabit Ethernet is not a simple scaling up of the Ethernet we already know. Although it should readily fit into existing networks and be easy to use and manage, this supercharged Ethernet technology entails much more robust product engineering.

Here's a look at the types of Gigabit Ethernet products that will appear in the market by mid-1997 and what users should look for in evaluating these products.

Five types of hardware will appear to serve the gigabit migration: Gigabit Ethernet network interface cards (NIC), aggregating switches that connect 100M and 1G bit/sec Ethernet segments, all-gigabit Ethernet switches, all-gigabit Ethernet repeaters and gigabit-enabled routers.

Better, faster adapters

In considering gigabit-per-second upgrades for servers and power workstations, users must select Gigabit Ethernet NICs carefully. At 1G bit/sec, CPUs cannot keep up with network throughput unless the NIC provides intelligent, host-assist functions. This also will apply to Gigabit Ethernet interfaces on routers and many existing lower capacity switches.

Traditionally, a workstation's throughput depends on its bus and memory architecture, as well as its CPU speed. With the 32-bit PCI bus, computers have the capacity to burst traffic at 1G bit/sec. The 64-bit PCI bus has higher throughput (2G bit/sec).

This faster bus speed is a major factor in gigabit readiness. But, at such speed, the system CPU can easily consume 100% of its cycles in orchestrating data transfer between the applications and the net, leaving no processing power for applications or other operating system tasks.

Gigabit Ethernet requires third-generation adapters featuring onboard Reduced Instruction Set Computing processors that perform intelligent, host-specific off-load functions. Incoming data is moved directly from the net to host memory locations that are immediately aligned for access by the applications. This eliminates the multiple interrupts of packet copying.

In fact, these NICs can issue a single CPU interrupt for multiple data packets — radically altering the packet/interrupt ratio, thereby eliminating the scalability problems inherent in older NIC designs. This not only enables faster throughput, but also helps applications run more efficiently by freeing the host CPU for application processing.

In addition, the packet/interrupt ratio can be user-configured or autosensed on such NICs. This allows for "adaptive" interrupts that vary in frequency depending on the net's burst volume. Intelligent Gigabit Ethernet adapters will evaluate net activity to determine which method to use at which time.

The earliest switching products will be differentiated along obvious lines: Some will simply offer Gigabit Ethernet ports; others will be engineered to cope internally with traffic loads.

In other words, some products will merely aggregate several Fast Ethernet links onto a single Gigabit Ethernet interface and, therefore, require only several hundred megabits per second of throughput. These are basically upgraded Fast Ethernet products, and are best deployed around the edge of a gigabit core. Other switching products will be designed to support gigabits of throughput across multiple ports.

The role of a Gigabit Ethernet switch is inherently different from that of its 10M and 100M bit/sec counterparts, and therein lies the main differentiator of this product class.

With gigabit traffic streams funneling through the LAN backbone, carrying a mix of data, graphics, voice and video exchange, backbone switches have to assume the mantle of high-end functionality. Traffic management, congestion control and quality-of-service (QoS) issues that until recently fell on ATM's lap now become Gigabit Ethernet's concern.

Some Gigabit Ethernet switches will take a simple bandwidth approach, dramatically lowering the cost of large, fat pipes so networks can be economically overengineered to satisfy most traffic needs. Others will implement enhanced QoS and broadcast reduction capabilities based on the pending Real-time Transfer Protocol and Resource Reservation Protocol standards.

Deploying these switches will require significant testing to ensure interoperability with existing Layer 3 equipment, while determining ease of configuration and net manageability. The simpler, high-bandwidth approach can be an easier tactical solution in the short term, but over time, Gigabit Ethernet switches must integrate standards-based traffic management and Layer 3 switching technologies to scale up in large nets.

The difference between these Layer 3, QoS-capable Gigabit Ethernet switches and ATM (and between gigabit switches themselves) will be one of degree. Users must decide whether they want to equip every net node with traffic intelligence and considerable processing power, or design the network to solve most problems with bandwidth alone.

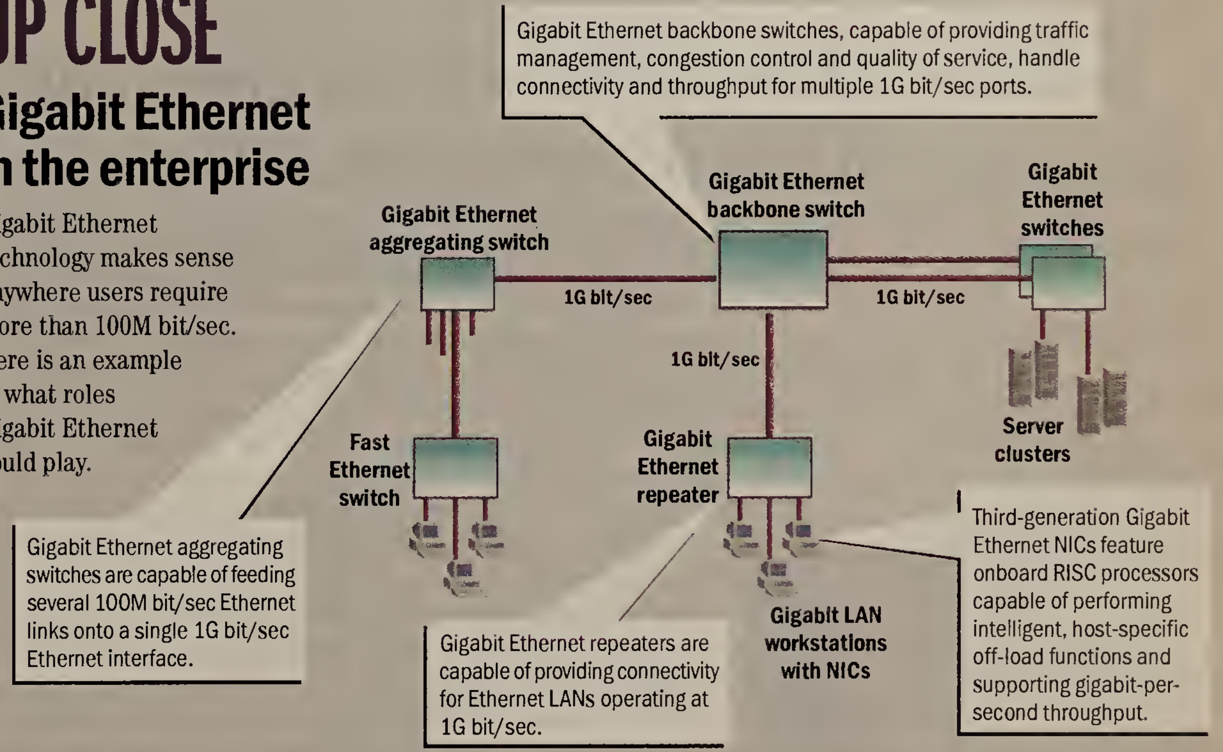
So a Gigabit Ethernet upgrade, easy from the standpoint of leveraging existing Ethernet installations, nonetheless entails careful consideration.

Strom is director of product marketing at Alteon Networks, Inc., a Gigabit Ethernet vendor in San Jose, Calif.

UP CLOSE

Gigabit Ethernet in the enterprise

Gigabit Ethernet technology makes sense anywhere users require more than 100M bit/sec. Here is an example of what roles Gigabit Ethernet could play.


Gigabit Ethernet aggregating switch
1G bit/sec
Gigabit Ethernet backbone switch
1G bit/sec
Gigabit Ethernet switches
1G bit/sec
Fast Ethernet switch
Gigabit Ethernet repeater
Server clusters
Gigabit LAN workstations with NICs

Gigabit Ethernet backbone switches, capable of providing traffic management, congestion control and quality of service, handle connectivity and throughput for multiple 1G bit/sec ports.

Gigabit Ethernet aggregating switches are capable of feeding several 100M bit/sec Ethernet links onto a single 1G bit/sec Ethernet interface.

Gigabit Ethernet repeaters are capable of providing connectivity for Ethernet LANs operating at 1G bit/sec.

Third-generation Gigabit Ethernet NICs feature onboard RISC processors capable of performing intelligent, host-specific off-load functions and supporting gigabit-per-second throughput.

EDITORIAL *insights*

AOL: The rest of the story

You know America Online, the biggest distributor of unrequested diskettes by mail and operator of the world's largest online service. But there's a side of AOL you probably don't know, one that might make it easier to build that intranet and support those far-flung workers.

COMPANIES to WATCH

AOL Enterprise was launched in March to help companies craft private networks that take advantage of AOL's infrastructure and the conferencing, E-mail and other software features AOL has developed.

The goal of AOL Enterprise is to increase business use of AOL by supporting private online communities — communities that can include employees and business partners. Case in point: Hewlett-Packard has set up what Mark Walsh, senior vice president of Enterprise, calls a private AOL to support retailers of its products. Other AOL Enterprise customers include Century 21 realty, PIP Printing (for franchisees), Sandoz pharmaceutical (for doctors) and the Harvard Business School.

With AOL Enterprise, you could give customers and employees access to common applications, such as HR systems, and databases, as well as set up private conferencing areas. You can establish software download areas and get information feeds from newspapers, magazines and research organizations, as well as provide access to the entire Internet or selected Internet and AOL areas.

AOL Enterprise service may be particularly interesting to companies with lots of remote and mobile workers, or telecommuters. You give everyone the same software (AOL with Microsoft's Internet Explorer) and let them dial in to AOL's hundreds of access points at up to 28.8K bit/sec. Larger sites can get high-speed links into AOL through its Advanced Network & Services unit.

Walsh's group will help you build your intranet, providing customized registration, security, billing and connection services, and handling technical support. You also get tools for easily adding or dropping people — clubbing or declubbing, the group calls it — from your private AOL.

Walsh says the advantages of AOL Enterprise are speed, cost and scalability. A private AOL can be up and running in as little as three weeks, and you can start small and keep adding users for a declining per-seat cost. A private AOL for, say, 2,000 users might cost between $50,000 and $100,000 to build, with monthly user fees on top of that.

AOL Enterprise offers an interesting outsourcing option for companies trying to tie together workers and customers. You can find out more by writing enterprise@aol.com or calling (888) 265-7253. (Don't try www.aol.com; there's not much on the unit there.)

John Gallant, editor in chief jgallant@nww.com

Totally Unplugged • Ira Brodsky

Are public schools grooming CIOs or computer jockeys?

Computer literacy has become almost an obsession in American K-12 education. Eager to please anxious parents, educators promise that no child will graduate without acquiring basic computer skills. But while our schools are churning out armies of PC operators, they run the risk of dulling the minds of potential information technology leaders.

Don't get me wrong. I'm not opposed to the use of PCs and the Internet in K-12 schools. What concerns me is our schools are treating computers and networks as ends rather than means.

In an attempt to make learning more meaningful and fun, modern education emphasizes hands-on learning, group activities and alternative forms of assessment. However, many teachers and administrators carry the game too far, openly expressing disdain for standardized tests and "static facts." Not surprisingly, the academic performance of American pupils has declined sharply compared to students in other countries.

Most computer literacy programs were created to conform with prevailing education philosophy. One of the philosophy's tenets is "No child should be left behind." All across the U.S., computer literacy programs are teaching elementary school children how to type, use a mouse and save data to a disk. But the programs expect children who come from households that already own PCs to spend hours performing tedious exercises, while their less-fortunate classmates catch up. In practice, the guiding principle seems to be "No child should get too far ahead."

Computer literacy programs were created by adults who grew up prior to the PC revolution. Could they be unaware that today's children are surrounded by video games, microprocessor-controlled microwave ovens and PCs? There is no need to teach teenagers how to surf the Web; most can figure it out on their own in 15 minutes. And is the education establishment oblivious to the fact that computers are constantly evolving? The basic computer skills being taught to today's 10-year-olds will almost certainly be obsolete by the time these kids enter the work force.

The education establishment is emphasizing technology over books and blackboards. Politicians act as if access to computer networks is a birthright. Newt Gingrich has suggested we give laptop computers to the poor — as if the difference between hope and despair hangs on one's ability to crank out a spreadsheet. What worries me is the message this must be sending to young people. In essence, they are being told everyone — regardless of individual interests and aptitude — must prepare for a career as a PC-wielding clerk-typist.

Computer literacy programs teach children how to use computers when children should be using computers to accomplish more important tasks. Teachers are laboring under the misguided notion that they should be giving children the tools they require for life-long learning, rather than concrete knowledge.

To wit: Modern educators believe it is more important to teach children how to play "Where in the World is Carmen Sandiego?" than fill their heads with lifeless geography facts. But I maintain it is more important to learn the facts. In real life, you may not always have a copy of your favorite geography game at your disposal.

Yes, virtually all good jobs require the ability to operate a PC. But the best jobs require the ability to analyze, communicate and make decisions. The first thing all children need is a liberal arts education. Those who master the three Rs — with the aid of computers where appropriate — will be ready for almost anything.

What the next generation of IT analysts, planners and managers needs is a well-rounded education.

If our children are going to make important contributions when they grow up, they will need to know more than just how to click on an icon.

Brodsky is president of Datacomm Research Co., a Wilmette, Ill.-based consulting firm. He can be reached via the Internet at ibrodsky@ix.netcom.com.

MESSAGE QUEUE

Send letters to nwnews@nww.com or John Gallant, editor in chief, Network World, *161 Worcester Road, Framingham, MA 01701. Please include phone number and address for verification.*

Scary implications

In his column on British Telecommunications plc's plan to acquire MCI Communications Corp. (Nov. 11, page 70), Mark Gibbs states, "BT won't operate in the same national context as an American company like, say, AT&T." Well, think this through.

The Internet is basically an electronic data conduit created by the U.S. to distribute computer power so a single nuclear strike would not cripple the U.S. It has been reported that MCI carries 90% of all Internet traffic on its wholly owned switches and backbones. Now MCI, soon to be a foreign-held company, is going to be

High-speed networking • Mary Petrosky

Points to ponder about Gigabit Ethernet

Gigabit Ethernet has captured our imagination for good reason. While ATM was once viewed as the only option for scaling network performance, Ethernet backers have proven that Ethernet can scale — at least from a bandwidth perspective. If you're looking to extend the life of your Ethernet networks, Gigabit Ethernet offers speed to accommodate increasing data traffic and backward compatibility with slower Ethernet versions, which makes deployment straightforward.

However, you shouldn't be seduced by speed alone; not all network problems can be solved by throwing bandwidth at them. Although Ethernet has served us well for years, and will for many to come, it's really a pretty "dumb" networking technology. As you plan your next-generation network infrastructure, keep in mind that multimedia applications, such as interactive collaborative applications and desktop videoconferencing, are coming — and sooner than you think if vendors such as Microsoft Corp., Intel Corp. and Netscape Communications Corp. have anything to say.

Unlike ATM, which has built-in support for bandwidth reservation and other quality-of-service (QoS) capabilities, Ethernet — at any speed — must get its brains from a layering of protocols. Although excess bandwidth can mask a multitude of problems and support various multimedia applications, bandwidth alone — no matter how much — isn't sufficient to provide *guaranteed* QoS.

Vendors have made significant progress in defining the technologies needed to multimedia-enable Ethernet.

However, much work still needs to be done. At Layer 2, the IEEE is defining prioritization schemes and multicast support within the 802.1q and 802.1p specifications. LAN switches are the most obvious devices to support these specifications.

At Layer 3, members of the Internet Engineering Task Force have defined the Resource Reservation Protocol (RSVP), the Real-time Transport Protocol and IP Multicast, and are working on additional protocols. Some type of Layer 3 device that's capable of at least forwarding traffic based on network-layer addressing — call it an IP switch, multilayer switch or the next-generation router — must be used. How to balance these Layer 2 and 3 technologies is still unclear.

The industry is in a dynamic phase. It could be 18 months before there's a clear picture of multimedia support over Ethernet. It appears that a combination of Ethernet (in all its speeds) and IP-related protocols will handle many of the same types of traffic as ATM, with the exception of audio. If you're looking to combine data and voice traffic on a single network, ATM is the best choice.

ATM is also the best choice if you need multimedia support today, and anticipate needing multigigabit links in your network in the next few years. With ATM becoming more common in the wide area, some organizations may find it attractive for seamless LAN-to-WAN integration. In addition, ATM is more clearly scalable than Ethernet, in terms of its speed and the size of the networks that can be built, as evidenced by carriers' adoption of ATM.

Certainly ATM is a revolutionary technology, entailing new internetworking equipment, new management tools and a learning curve. However, Gigabit Ethernet may not be the no-brainer it appears to be. Clearly, any organization that plans to use Gigabit Ethernet only for connectivity will find it easy to deploy. However, if you want Gigabit Ethernet to deliver ATM-like functionality, and you expect to deploy multimedia protocols such as RSVP, you'll need new internetworking and management gear, and will have to climb that learning curve.

And be sure to weigh Gigabit Ethernet's real costs. You may not be able to simply add Gigabit Ethernet interfaces to existing switches and routers; in some cases, you'll need more powerful hardware. The need for fast backplanes, larger buffers and other component changes could make the overall system cost of Gigabit Ethernet higher than the estimated per-port prices suggest.

Also, with so many multimedia capabilities being defined at Layer 3, you need to consider how much Layer 3 intelligence you'll need — you may need it down to the wiring closet.

Because of broad industry support, Gigabit Ethernet will be a cost-effective, high-speed network alternative to ATM for some organizations. However, you should carefully consider your current and future network requirements — such as a need for real-time, multimedia application support, or a desire to combine voice and data networks — before jumping on the Gigabit Ethernet bandwagon.

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carrying 90% of all traffic the U.S. government sends across the Internet.

During World War I, the U.S. had problems getting started in the war effort because its tool-and-die machines relied on German-manufactured parts. As a result, a law was passed stating that militarily used parts must come from a majority of U.S.-manufactured materials. So this means the Department of Defense must completely abandon the Internet as a military communications means, or must create its own Internet using U.S.-held companies.

The implications of this buyout are staggering.

Ed Kummel
Network administrator
InTouchUSA, Inc.
Reston, Va.

Cheers for NDS

Hooray for Mark Gibbs' column differentiating the roles of Novell, Inc.'s NetWare and Microsoft Corp.'s NT Server (Nov. 18, page 113). As a Certified Novell Engineer and soon-to-be Microsoft Certified Engineer, it galls me when clients insist on using NT Server as a file and print server, or try to manage 27 application NetWare Loadable Modules running on a single NetWare server.

I sincerely hope that Novell Directory Services (NDS) will resurrect the onetime giant. It is truly a joy to work within a NetWare environment, and NDS will hopefully fulfill its promise as an enterprise directory tool.

Chris Meyers
Systems analyst
James Moore & Co.
Gainesville, Fla.

Don't toss those cookies

In his column "Cookies are not always a treat for Web users" (Nov. 25, page 38), Ira Hertzoff shares some common misconceptions about the use of cookies on the Web.

A cookie is merely a piece of data — not executable code. Its primary use is to maintain state, allowing a Web server to recognize an end user from one request to the next. The assertion that "...it may be possible to create a virus-like cookie that could wipe out a user's hard drive" raises fear where none is warranted.

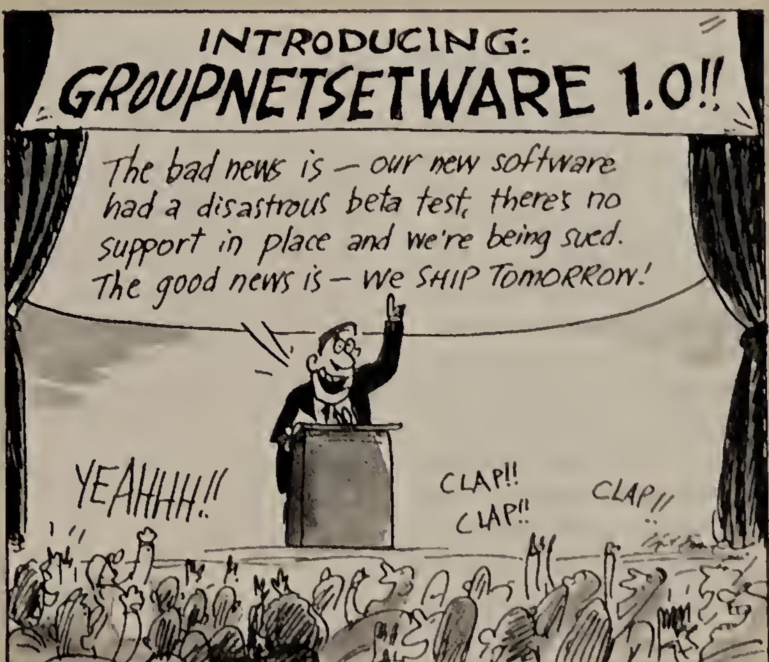
Second, the idea of tracking a user through a site is not new. Any number of sites use hidden data passed back in the URL field to maintain state from one hit to the next. The cookie is merely a more elegant way of doing this — and more up-front.

Third, there are a number of very good reasons — beyond marketing — to track a user's path through a Web site. Path data is invaluable for tweaking a site's design to fit the needs and browsing habits of the customer.

It may be that some individuals choose to use cookies for less than honorable purposes. However, it's important to remember that there are other methods already in place that provide similar functionality. Don't blame the cookie.

Mark Brown
Webmaster
Visa International, Inc.
Oakland, Calif.

Teletoons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YEAHHH!!
CLAP!!
CLAP!!
CLAP!!

Policing your network

These four security auditing tools can help deter shady operators

By Kristin Marks

To prevent burglaries, you put a good lock on your door. To feel even safer, you find a well-policed neighborhood.

Protecting your network starts much the same way. Door locks — both locks that keep your servers secure and logical locks such as password protection — are just the tip of the security iceberg. The more complex your environment, the greater potential for security weaknesses. To find them requires use of auditing packages, which act as network police, helping you assess your weaknesses and maintain security standards.

We looked at four products that provide security auditing for NetWare or Windows NT operating systems. All provide some security auditing functions, but in very different ways.

LT Auditor+ from Blue Lance, Inc. and AuditTrack from e.g. Software, Inc. are essentially event viewers for the NetWare environment. They keep track of events, let you filter them to show the most serious ones and generate reports from the event log. Kane Security Analyst (KSA) from Intrusion Detection, Inc. compares events and security-related parameters to a set of best practices and creates a report card of how your network is doing. BindView Development Corp.'s BindView Enterprise Management System (EMS) provides the most comprehensive set of security reports and analysis of the four products, and it does so with the best management interface, managing NetWare 3.X, 4.X and Windows NT servers from a single console. BindView EMS does much more than security auditing, but for this review we focused only on that.

AuditTrack and LT Auditor+ provide only intruder tracking. Any analysis to be done is performed by you — they just provide the data you need for figuring out what happened. This is a bit like closing the barn door after the animals have fled. BindView and KSA analyze your net and make recommendations, which gives you a better chance of keeping the horses in their stalls.

AuditTrack

AuditTrack is the simplest product of the bunch to install and run. The console component lets you filter, report and graph any event tracked by the AuditTrack NetWare Loadable Module (NLM), which runs on NetWare 3.X or 4.X.

When you first load the NLM, you must configure it, including setting the Master auditor password. This is supposed to keep unauthorized people from unloading the NLM, even if they gain access to the console. Of course, you can still use the server console to down the server and bring it back up without running AUTOEXEC.NCF, where the tracking NLM is loaded. The management console is also password protected.

Running the products is easy. Both AuditTrack and LT Auditor+ report on server events such as file open, file run, file delete, user creation and trustee modification. They provide an interface for filtering and sorting events. Both products let you define audit sets — groups of events you want to watch. For example, you can report on just the user "Kristin" or just on file attribute changes.

More difficult is deciphering the vast amount of data available in the reports. Remember how DOS searches for a program in the current directory first, then searches through the path until it has been found? Every time a user runs a program, AuditTrack reports "invalid path or file name" for each directory searched and then reports the run of the executable file when found. This produces an average of three extraneous error messages (current directory, local root, and possibly local Windows and network search path) for every "file run" message.

ScoreCard

	BindView EMS	LT Auditor+	AuditTrack	Kane Security Analyst for Windows NT
Overall score	**9.7**	**7.6**	**8.8**	**7.0**
Administration (15%)	10	7	7	8
Stability (15%)	9	5	10	8
Reporting (15%)	10	8	8	5
Accuracy (20%)	10	9	10	6
Configuration (10)%	10	8	8	8
Ease of use (10%)	10	8	9	7
Installation (10%)	8	9	10	8
Documentation (5%)	10	6	7	6

Scores based on a scale of 1–10. Categories are weighted by the percentages shown.

NetResults

Product	**BindView EMS with BindView NOSadmin for Windows NT Version 5.0**	**LT Auditor+ Version 5**	**AuditTrack Version 3.1**	**Kane Security Analyst for Windows NT Version 3.01**
Vendor	Bindview Development Corp. (800) 749-8439 www.bindview.com	Blue Lance, Inc. (713) 680-1187 www.bluelance.com	e.g. Software, Inc. (503) 294-7025 www.egSoftware.com	Intrusion Detection, Inc. (212) 348-8900 www.intrusion.com
Price	• Windows NT Server license - $495 • Windows NT user license (100 users) - $1,495 • Console - $695 per concurrent administrative user • NOSadmin for NetWare 3 - $795 per server • NOSadmin for NetWare 4 - $495 per server • 100 network user objects - $1,495	• Single server license - $995 • Master server license (up to 50 servers) - $24,875 plus mandatory annual maintenance $3,731	Per server: • 25-user license - $595 • 50-user license - $795 • 100-user license - $1,195 • 250-user license - $1,695 • 500-user license - $2,995 • 1,000-user license - $4,995	• Windows NT - $495 per server • NetWare 4.X - $495 per server
Pros	▲ Manages NetWare and NT from a single console ▲ Comprehensive and accurate tracking and analysis ▲ Distributed management console ▲ Can determine where excessive rights come from	▲ Simple to use ▲ Reports can be generated offline – on a laptop for example ▲ Can consolidate reports from multiple servers	▲ Extremely easy to use event viewer ▲ Can graph any report	▲ Good high-level management reporting ▲ Top 10 list of security weakness can be scheduled and attached to E-mail ▲ C2 comparison assessment included
Cons	▼ None significant	▼ NetWare only ▼ Generated some error messages ▼ At the highest magnification, reports are too small to read on screen forcing you to print everything of interest	▼ Runs on NetWare only ▼ Reports track every normal and abnormal for each event type, forcing you to sort through long lists looking for pertinent information	▼ Difficult to find out why the network fails a security assessment ▼ Only one multipart report ▼ Failed our password tests

There is a positive side to this. You can determine if your applications are being accessed in the most efficient manner, and adjust your user menus and search paths accordingly. If you receive eight or nine "file not found" errors before every program execution, you should redesign the way your users launch applications.

Both AuditTrack and LT Auditor+ keep track of every time you access or change screens inside of NetWare management utilities such as NWAdmin. For example, we used NWAdmin to verify that users could change their own passwords and AuditTrack reported the access, even though nothing changed. The plus side to this is that if someone is just sniffing around in advance of actually hacking, you'll notice, but we wish there was an option to report only changes.

Any tracked event can be turned into a report or a graph with a click of a button. AuditTrack lets you set up groups of tracked events as audit sets. An audit set can have one tracked event, such as file open, or several, such as all tracked directory services events.

AuditTrack can be configured to send broadcast alerts to a list of users, but more sophisticated alerts are unavailable without additional products.

This product is not an enterprise solution because management is on a server-by-server basis.

LT Auditor+

Like AuditTrack, LT Auditor+ is a simple NetWare 3.X and 4.X event viewer. It has NLM and console components, and requires that you run Btrieve.NLM on the server, which it automatically loads. The interface is almost as intuitive as AuditTrack's.

While licensed on a per-server basis, LT Auditor is not limited to reporting on a single-server basis. From a single administrator console, you can consolidate data from several servers and build a single report covering them all. LT Auditor+ also includes options for exporting data to other programs, such as Microsoft Excel, for analysis.

Go online for details on how this test was conducted and information on two white papers from the Open User Recommended Solutions (OURS) user group: "A Guide to Evaluating Directory and Authentication Services" and "Enterprise Security Administration Recommendations." Enter the number to the right in the DocFinder box on the home page.

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Security at the console is controlled by switches. Loading LTAUDIT.NLM with the /U switch means you can't unload it without downing the server. Another switch makes the LT Auditor+ NLM server console screen invisible, but we're not sure how valuable that is. The product uses two NLMs — the second one is the LTMERGE.NLM, for merging data from multiple servers, and there's no switch to hide it — so an intruder with console access would still be tipped off that auditing was loaded. Likewise, any serious intruder would use MONITOR.NLM to check loaded processes, and LTAUDIT would be sitting there in memory. But that's okay — visible security auditing should be a deterrent.

An additional security issue in some environments is the lack of password protection on the management console, meaning the server should be physically secure.

There are two modes for analyzing LT Auditor+ data — connected to the LAN and portable, which means you download data and analyze it offline.

LT Auditor+ uses the Crystal Reports engine, so report formats are pretty but difficult to read on-screen, where they first appear. You can view reports at three increasing levels of magnification. Even at the highest magnification on a VGA 640-by 480-pixel display, the font was too small to read, forcing us to print the report — an awkward and time-consuming process when you're trying to catch a culprit in action. If you use cc:Mail, Crystal Reports can automatically send any report via E-mail.

Despite the ability to analyze reports offline, we liked this product less than AuditTrack. It swallowed approximately 5M bytes of server RAM, compared to AuditTrack's approximately 2M bytes. There is no browse button for adding users, or searching directories when filtering the default report; you have to type the value into a text box, requiring you to remember long context or directory paths.

We also experienced some errors running the application, including increasing memory usage and the NLMs abending our NetWare 4.1 server. Unfortunately, the manual has no index, so it was difficult to look things up during troubleshooting.

Kane Security Analyst

KSA comes in two flavors — KSA for NetWare and KSA for Windows NT. They are separate products and neither can handle servers of the other type, so you can't get a whole network assessment if you have a mix of NetWare and NT. The KSA products do, however, provide analysis — lots of it. Using KSA is like having an Intrusion Detection security analyst take a snapshot of your network and give you a report card.

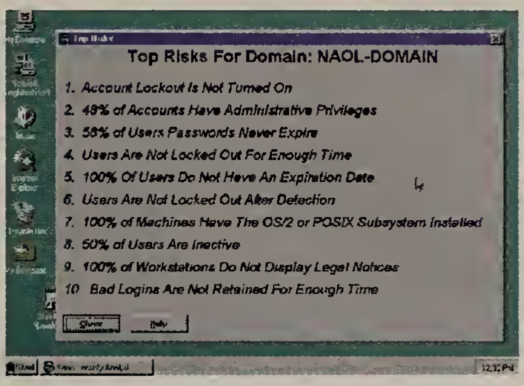
We tested the KSA for Windows NT. The vendor is working on a revision of the NetWare product, due out by the time you read this, which includes support for 32-bit desktops, but the software wasn't ready for us to test.

The KSA for NT installation went smoothly, except that the auditor must have the advanced NT right "act as part of operating system," which you have to set up yourself. If you don't, the product runs but could give you incomplete or erroneous data, as it did in our lab.

Intrusion Detection recommends running the NT version on a 150-MHz or faster Pentium or symmetric multiprocessing workstation. We can see why — on our 486/66 with 32M bytes of RAM, it was slow. The management console is not password protected, but it is easy to use.

The product performs network security assessments based on a set of best practices determined by the vendor's consultants' experience with clients. While the default set is based on the manufacture's experience, you can develop your own set of secure values and save them as personal best practices. The documentation is a three-ring binder mostly concerned with explaining all the parameters included in best practices.

The first step in using KSA is to run an assessment. Assessments are NT domain-oriented rather than server-oriented. The results of an initial assessment include a Top Risks list of value judgments and a quick overview of how secure your network is (see Figure 1). For example, the default practices believe logon station restrictions are a good thing. Without them, you receive a lower security score on the Top 10 Risk list. If you don't believe this is an appropriate restriction for your user community, you'll want to remove it from your personal best practices.


Top Risks For Domain: NAOL-DOMAIN

1. Account Lockout Is Not Turned On
2. 48% of Accounts Have Administrative Privileges
3. 58% of Users Passwords Never Expire
4. Users Are Not Locked Out For Enough Time
5. 100% Of Users Do Not Have An Expiration Date
6. Users Are Not Locked Out After Detection
7. 100% of Machines Have The OS/2 or POSIX Subsystem Installed
8. 50% of Users Are Inactive
9. 100% of Workstations Do Not Display Legal Notices
10 Bad Logins Are Not Retained For Enough Time

Figure1: *Kane Security Analyst's Top Risks list shows the biggest risks according to their "best practices" for our Windows NT domain.*

The Top Risks list is followed by the Report Card, which scores what percentage of network objects fail in specific categories. These two are the only screen reports available. They can be scheduled for every day or every X number of days, and can be E-mailed or printed. There is no alerting mechanism.

KSA is the only product we tested that includes baselining functions, which let you assess your network's ongoing security weaknesses against a previous snapshot, though BindView told us baselining functions were in development.

KSA gives you one full management report, written in the hard-to-read passive voice, complete with cover page, table of contents and executive summary. The Report Card is one of the report components.

The full report on a small network prints about 30 pages. Unlike the other three products, the only other reporting capability is printing specific sections of the one management report. AuditTrack, LTAuditor+ and BindView EMS all let you create your own reports for any set of information and save them for repeated use.

We also have to question the accuracy of the KSA audit. The compliance summary for our NT domain said we passed the "password strength, password exists" and "password strength, password not easily guessed" categories even though our users had no passwords.

This erroneous data was partially attributed to the fact that the user ID we logged on with did not have the required rights. We would prefer that the product return an error message stating that password tests could not be accomplished due to insufficient rights, or better yet, that complete rights be established during the installation.

While there is an array of analysis done, it is difficult to get much detail. For example, the Security Events report can tell you which user account created the new admin-equivalent user on your NT server, but not which node this user account was logged on from at the time — a key piece of information and a slightly incongruous feature because node ID restrictions are considered a security issue on the Report Card.

KSA provides less auditing history than the other three products and more comparison against a set of values. As such, it's most appropriate for managers who want to make a case for developing better security practices.

BindView EMS Console

Of the products we tested, BindView EMS Console with NOSadmin for Windows NT Server plug-in provided the most complete set of historical tracking and analysis.

BindView lets you assess your Windows NT and NetWare 3.X and 4.X servers from the same console, and it's an administrator's dream come true.

We tested the shipping NetWare and beta Windows NT Server components. We installed the management console on our Windows 95 system. The interface follows a folder metaphor so you can create your own folder, store any of the several predefined reports or create your own reports. You can also make your folders available on other users' desktops. Because each administrator has to log on to the workstation console with a password, you can delegate subsets of information to junior administrators on the same system, or you can purchase additional console licenses if you want them to have their own consoles.

You determine what parameters you want to look at by defining a query and limiting it to a scope.

Scopes can be limited to a particular resource, such as a network operating system, a domain or part of a directory tree. This truly reflects the way enterprise management works.

The default on-screen report format is grid style, which is utilitarian but not pretty. Double-clicking on a record brings up well-organized, detailed information on the current record.

For example, clicking on any record in the User Privileges Analysis grid brings up an icon-driven set of detail sheets for things such as user properties, workstation logo parameters, group membership and detailed privileges lists.

Printing any grid generates reports with full control over formatting and data placement. You can quickly produce a comprehensive set of reports on security parameters that include values, judgments and history. The default formatting generates presentation-level reports. But if you want an executive summary or Report Card such as that provided by KSA, you have to write it yourself. Reports can also be displayed as graphs (see Figure2).

The predefined reports for NetWare and NT are relevant to each operating system and provide an array of analysis on, for example, inappropriate naming standards, invisible objects for Novell Directory Services, domain security, or users that last logged on a month or more ago. You can create your own query, filter and scope, save it, and schedule it to run automatically.

We didn't run into any erroneous data or program errors on the shipping product, unlike with the other three products. The only items we could even slightly complain about were the lack of a baselining feature and that the underlying database structure on the console workstation is Btrieve — we would prefer something more open so database gurus at larger sites could manipulate the data for custom integration with, say, purchasing department data.

To sum up

In fact, we were generally disappointed with all the products in the security auditing field. A mature security auditing product would support multiple servers and NOSes from a single management console, provide flexible reporting, store historical data in an open database, and be the most secure application on the network itself. Service processes, such as NLMs, should be difficult to unload and consoles should require authentication before allowing access.

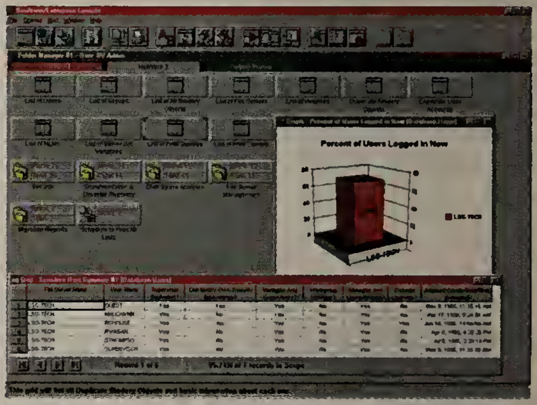


Figure 2: *BindView EMS lets you manage NetWare and NT security from the same console. All reports can be shown as graphs.*

BindView is the only product even close to what today's networks need. AuditTrack seems stuck in 1991, when all LANs were NetWare and there were seldom more than two servers. Its only modern feature is that it can track directory services events. LT Auditor+ behaves poorly on the server, spewing out a variety of memory-related errors and occasionally abending.

Despite that, it's one step closer to today's networks than AuditTrack because it can merge data from multiple servers for viewing with a single console. We would look at KSA only to see what topics should be included in a security report for management.

Choosing the most appropriate tool for your network depends on your requirements. If all you need is NetWare event tracking, AuditTrack or LT Auditor+ fit the bill. If multiple server analysis is important to you, choose LT Auditor+; if you care more about running smoothly without crashing, pick AuditTrack.

If you don't want to worry about accuracy or cross-platform support, then there's no choice but BindView. Its ease of use, range of analysis and detailed reporting with distributed management functionality make this product a clear winner.

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IP Version 6 solves lots of problems, but only if you understand how to use it.

Finding your way through the new IP

By Mark Miller

It has vendors scrambling in their labs, madly revising code for routers and hosts. It has developers furiously churning out requests for comment, trying to keep up with all the changes. And soon, it will have you scouring the road maps others are now drawing that show how best to implement it in your organization.

"It" is IP Version 6, the next-generation Internet Protocol. You've likely heard about the vastly expanded addressing field it brings, and that is certainly an important aspect, but there's lots more you need to understand about IPv6 before you begin to implement it. There are new and expanded formats and fields you'll need to explore, security and configuration features you'll want to understand, even additional traffic types supported, which could change how you think about carrying voice and video.

Most products aren't due out the door until next year, but IPv6 differs so much from its predecessor that you'd be wise to begin boning up now. This feature, and one that will follow next month about migration strategies, will get you started.

So why do we need a new IP? Since its inception — the original IP specification, RFC 791, was published in 1981, but its roots date back to the early 1970s with the development of ARPANet — IP has been implemented on every conceivable type of platform and operating system, all pretty successfully.

In many ways, this success, and the explosive growth of the Internet, exposed several weaknesses in the original design. The 32-bit address field, which can identify more than four billion systems, would have been adequate were it not for the address field's class-based structure that reduced the efficiencies of that field. (For more on the existing IP address structure, see *NW*, Aug. 19, page 45.)

Other key issues not anticipated by the original developers include the need for greater secu-

TOM FOTY

rity and support for real-time traffic flows, such as voice over the Internet.

Design criteria

RFC 1726, Technical Criteria for Choosing IP the Next Generation (IPng), describes a number of key functions for the new version of IP. Many of these build upon functions, such as topological independence, that have made the Internet the success it is today. Others provide for future expansion and yet-to-be defined applications.

Among these criteria are:

- Scale. IPng must scale to allow the identification and addressing of at least 10^{12} end systems and 10^9 individual networks.
- Topological flexibility. The routing architecture and protocols of IPng must allow for many different network topologies. Stating up front that no single topology, such as a tree topology, is assumed provides for future Internet expansion, growth and technologies.
- Transition. The protocol must have a straightforward transition plan from the current IPv4.
- Media independence. The protocol must work across an internetwork of many different LAN, MAN and WAN media. These media may operate at speeds from a few bits to hundreds of gigabits per second. Again, the idea is that IPng must not be tied to any one type of technology.
- Automatic configuration for hosts and routers.

ADDRESSING BY THE INCH

To say the number of addresses available in a 128-bit address field is a large number is a gross understatement – two to the 128th power is a very large number indeed. Internet trivia buffs have estimated that this equates to approximately 1,500 addresses per square angstrom on the Earth's surface. An angstrom is one ten-billionth of a meter. This equates to billions of IPv6 addresses per square meter on the Earth.

In practice, a number of factors serve to reduce that number. But Christian Huitema, author of the book *IPv6, the New Internet Protocol*, says even his most pessimistic estimates indicate there will be about 50,000 addresses per square meter of dry land on Earth, or about 32 addresses per square inch – the size of the box above.

- Secure operation. IPng must provide a secure network layer.
- Mobility. The protocol must support mobile hosts, networks and internetworks.
- Extensibility. The protocol must be able to evolve to meet the Internet's future service needs.

Meeting all of the above criteria was a tall order. The Internet Engineering Task Force's (IETF) IPng Working Group researched the issues over a two-year period and evaluated a number of proposals.

No single proposal met all the requirements. So the IPng Working Group took elements from the three most significant proposals — the Common Architecture for Next Generation Internet Protocol (CATNIP), TCP and UDP with Bigger Addresses (TUBA) and the Simple Internet Protocol Plus (SIPP). It synthesized the best features of each and put them into the protocol that we now call IPv6.

Comparing IPv4 and IPv6 packets

RFC 1752, The Recommendation for IP Next Generation Protocol, discusses the merits of the various protocols proposed for IPng, strengths and weaknesses of each, and the features of each that were blended into the resulting IPv6.

The objectives of the IPv6 design are accomplished with a number of constructs. There's the revamped addressing scheme that uses 128 bits instead of the current 32, and a packet format that allows options to be placed in extension headers. This provides for streamlined packet processing within routers, as each host or router just looks at headers relevant to its packet-forwarding functions.

Other functions support the notion of plug and play, where new nodes on the network can obtain their addresses and parameters without requiring server involvement in every case. Support for real-time traffic flows, such as voice and video, is also available, so that the Internet or intranet of the future could also be your telephone or cable provider.

The IPv6 header is 320 bits — or 40 octets — in length, and is broken into eight fields (see Figure 1). (An octet is an 8-bit quantity of information. The term is preferred over byte in international data communications standards because while in the U.S. a byte is 8 bits, that is not always the case in other countries.)

The Version field is 4 bits in length and identifies the version of the protocol (6 for IPv6). The Priority field is also 4 bits long and enables a source to assign a delivery priority to its packets. For example, network management or routing protocol updates might be assigned a higher priority than news or E-mail traffic. This way, the most important traffic would have the best chance of getting through a congested network.

The 24-bit Flow Label field is used to identify data transmissions that need special handling. This concept is currently in the experimental stages of development, but might be used to support real-time data transfers over the Internet.

The Payload Length field is a 16-bit number, which measures the length, given in octets, of the payload or the balance of the IPv6 packet. Payloads range from 576 to 65,535 bytes, or octets. If larger amounts of data must be sent, the Jumbo Payload Option may be implemented. This is an improvement over IPv4, which is limited by the 65,535 value.

Figure 1: DISSECTING THE IPv6 PACKET HEADER

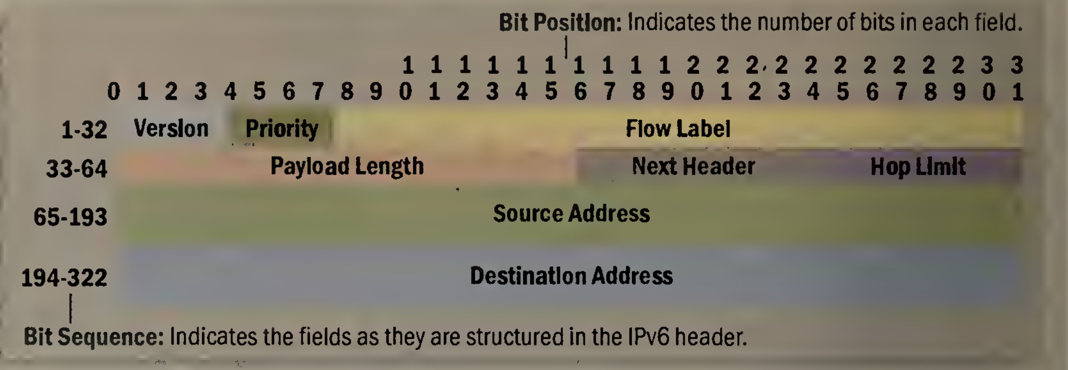
Version (4 bits): The IP version (6).

Priority (4 bits): The priority of this packet, relative to other packets from the same source.

Flow Label (24 bits): Identifies a packet flow that may require special handling.

Payload Length (16 bits): The length of the rest of the packet (following the header), given in octets.

Next Header (8 bits): Identifies the header following the IPv6 header.



Hop Limit (8 bits): A number that is decremented by one by each node that forwards the packet. If the Hop Limit reaches zero, the packet is discarded.

Source Address (128 bits): Identifies the originator of the packet.

Destination Address (128 bits): Identifies the intended recipient of the packet, but not necessarily the ultimate recipient if a Routing Header is present.

The Next Header field is 8 bits in length and identifies the header immediately following the IPv6 header, such as TCP or one of the IPv6 extension headers.

Next comes the Hop Limit field, which is 8 bits in length. The Source and Destination Addresses are 128-bit fields that identify the originator and intended recipient of the packet, respectively.

When you compare the IPv6 header with the existing IPv4 header, you'll find that the IPv6 Priority field functions similarly to the IPv4 Precedence field, the IPv6 Next Header field functions similarly to the IPv4 Protocol field, and the IPv6 Hop Limit field functions similarly to the IPv4 Time to Live field.

Future-proofing: Optional headers

Even though the IPv6 address is four times as long as IPv4's, the base header is only twice as long: 40 octets vs. 20 for IPv4. Streamlining the packet header operation and moving some optional functions into extension headers accounts for this efficiency.

For example, if a function such as fragmentation is required, its overhead is placed in a special extension header. In that way, you reduce overhead by using only the fields you need, depending on what you are trying to do. The originating host determines the optional extension headers required, and they are examined as necessary by the intervening routers.

The IPv6 packet may thus consist of zero, one or more extension headers arranged in a daisy-chain format. The value of the Next Header field identifies the header that comes next.

Six optional extension headers have been defined:

- Hop-by-Hop Options — Carries information that must be examined and processed by every node along a packet's delivery path, including the destination node.
- Destination Options — Carries information that need be examined only by a packet's destination. (There are as yet no specific uses defined for the Destination Options. This is an example of how IPv6 allows for future, unanticipated requirements.)
- Routing Header — Specifies the intermediate nodes comprising the path from the source to the destination.
- Fragment Header — Used by the source to divide large messages into fragments that can be processed by the intervening routers.
- Authentication — Provides data integrity and authentication, using schemes such as Message Digest 5 (MD5).
- Encapsulating Security Payload — Provides data confidentiality, using schemes such as the Data Encryption Standard.

HEY, WHAT HAPPENED TO IPv5?

You may have been observant enough to notice that the current IP is Version 4, yet the new Version is 6, not 5. That's because Version 5 was assigned to the Internet Stream Protocol Version 2 (ST2), an experimental protocol documented in RFC 1819. ST2 was developed as an adjunct to IP for the support of real-time transport of multimedia data.

Structuring the IPv6 packet into a base header followed by optional extension headers will simplify adding features and functions to the protocol in the future.

IPv6 address types

IPv6 solves the IP address depletion problem in a dramatic way: It increases the address space from 32 to 128 bits. RFC 1884, IPv6 Addressing Architecture, defines three different types of IPv6 addresses:

- Unicast provides point-to-point communication.
- Anycast lets you communicate with the closest member of a group of devices.
- Multicast lets you communicate with multiple members of a group of devices.

The anycast address is a new type that lets you, for example, communicate with the closest router. That router would then propagate the information to the other group members. In this way, a host could

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send an update to one router, which would then take responsibility to retransmit that information to all group members.

In the case of multicast addresses, a field limits the packet's scope; that is, how far it can travel. For example, if you use a multicast address for a teleconference within your organization, you can ensure that the packets from your local network do not sneak past a router and get to the global Internet.

There's more IPv6 info online, including links to the 6bone and IPng home pages. Each provides details on IPv6 implementation and specifications. You can also learn more about IPv6 from various related RFCs, including this sampling:

RFC	SUBJECT
1550	IPng White Paper Solicitation
1726	Technical Criteria for Choosing IPng
1752	Recommendation for IPng
1825	Security Architecture
1826	Authentication Header
1827	Encapsulating Security Payload (ESP)
1881	IPv6 Address Allocation
1883	IPv6 Specification
1884	IPv6 Addressing Architecture
1885	ICMPv6 for IPv6
1886	DNS Extensions
1887	Unicast Address Allocation
1897	Testing Address Allocation
1933	Transition Mechanisms
1970	Neighbor Discovery
1971	Address Autoconfiguration
1972	IPv6 over Ethernet
1981	Path MTU Discovery
2019	IPv6 over FDDI
2023	IPv6 over PPP

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Each address consists of a defined prefix, plus an address. Currently, approximately one-eighth of this address space has been defined, leaving plenty of room for growth.

The prefix, which is the first 3 to 11 bits of the 128-bit address, determines the format of the address. So some prefixes identify unicast addresses, and others identify multicast addresses. Still other prefixes identify special cases, such as addresses used on a particular communication link, or those used within a particular site or organization.

For example, there is a provider-based unicast address format, which would be assigned by an Internet service provider to an organization (see Figure 2). Some fields, such as a subnet ID, within that address would then be assigned by the local network administrator.

Address representation

Remembering a 32-bit IPv4 address as designated in binary format would take a lot of memory work. To make this easier, a shorthand notation, called dotted decimal was developed.

With dotted decimal, the 32-bit address is divided into four sections, each 8 bits long. Each 8-bit binary number is then represented in decimal format by a single number between 0 and 255.

For example, the binary address:
11000000 00011000 00000000 00000000
would be represented as 192.24.0.0 in dotted decimal.

Since IPv6 addresses are 128 bits long, either your memory must dramatically improve, or a different method of representation is required. RFC 1884 suggests the format x:x:x:x:x:x:x:x, where each x represents a group of 16 bits. Since the address is 128-bits long, it will therefore be represented as eight groups of 16 bits each. In this case, however, each 16-bit section is represented by four hexadecimal numbers. (Hexadecimal, or base 16 arithmetic, uses numerals for numbers 0 through 9, then the letters A through F to represent numbers 10 through 15.)

For example, an IPv6 address could be in the form:
FEDC:BA98:7654:3210:FEDC:BA98:7654:3210

Since much of the IPv6 address space is yet to be assigned, lots of zeros will appear in the addresses. Two shorthand notations help simplify matters.

The first method eliminates leading zeros within one of the 16-bit fields.

For example, instead of writing four zeros, you can just write a single zero. So:
1080:0000:0000:0000:0008:0800:200C:417A
may be simplified to:
1080:0:0:0:8:800:200C:417A

The second method allows the simplification of long strings of zeros that appear within an address. In this case, a double colon may be used to indicate that multiple groups of zeros have been omitted, which further simplifies the example shown above. In this case:
1080:0000:0000:0000:0008:0800:200C:417A
was simplified to:
1080:0:0:0:8:800:200C:417A
and may be further simplified to:
1080::8:800:200C:417A

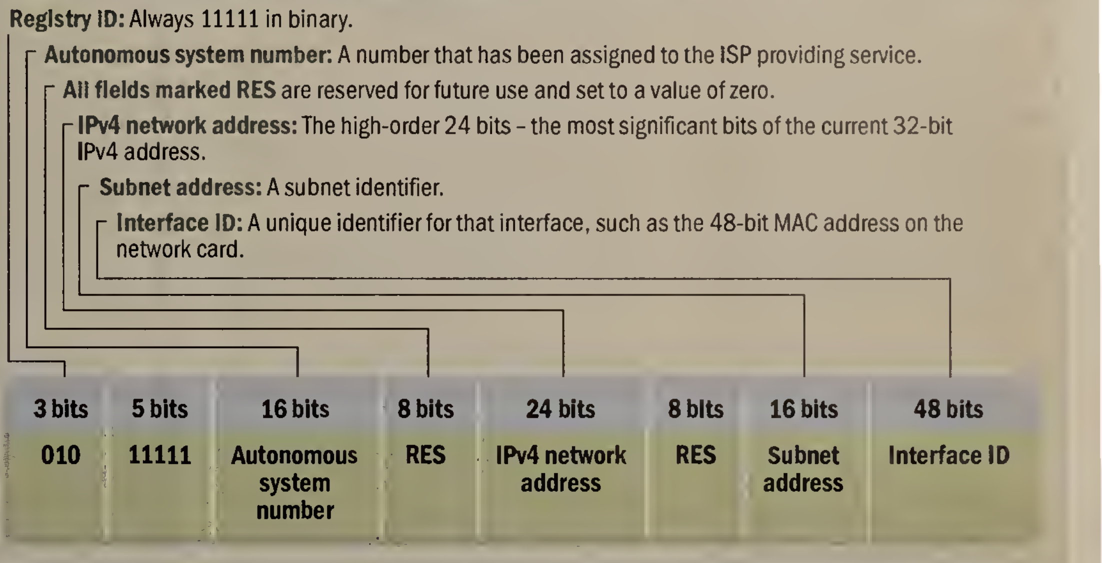
To avoid ambiguity, the double colon may appear only once in an address. To expand this simplified address, you would go to the double colon and add zeros until the address was again 128 bits long.

A support system required

New protocol operations have been developed to support some of the other IPv6 functional requirements. The clearest examples are the Authentication and Encapsulating Security Payload headers, which provide for a secure IP layer — a necessary requirement to further Internet commercialization.

Figure 3: IPv6 TEST ADDRESS

A special form of the provider-based unicast address that is being used for testing IPv6 implementations, such as on the experimental 6bone network. See RFC 1897 for further information.


Registry ID: Always 11111 in binary.
Autonomous system number: A number that has been assigned to the ISP providing service.
All fields marked RES are reserved for future use and set to a value of zero.
IPv4 network address: The high-order 24 bits – the most significant bits of the current 32-bit IPv4 address.
Subnet address: A subnet identifier.
Interface ID: A unique identifier for that interface, such as the 48-bit MAC address on the network card.
3 bits
5 bits
16 bits
8 bits
24 bits
8 bits
16 bits
48 bits
010
11111
Autonomous system number
RES
IPv4 network address
RES
Subnet address
Interface ID

Another is the Stateless Autoconfiguration Protocol, which enables many of the plug-and-play capabilities required of IPv6.

For example, let's suppose you take your notebook computer on a trip and want to join a colleague's IPv6-based network. The Autoconfiguration Protocol provides a way for your notebook to assign itself an IPv6 address, which is based, in part, on its LAN adapter address.

Since the LAN adapter address is unique, the self-assigned IPv6 address will be unique as well, thus preventing a duplicate address.

If all works as planned, the manual intervention of the local network administrator is no longer required.

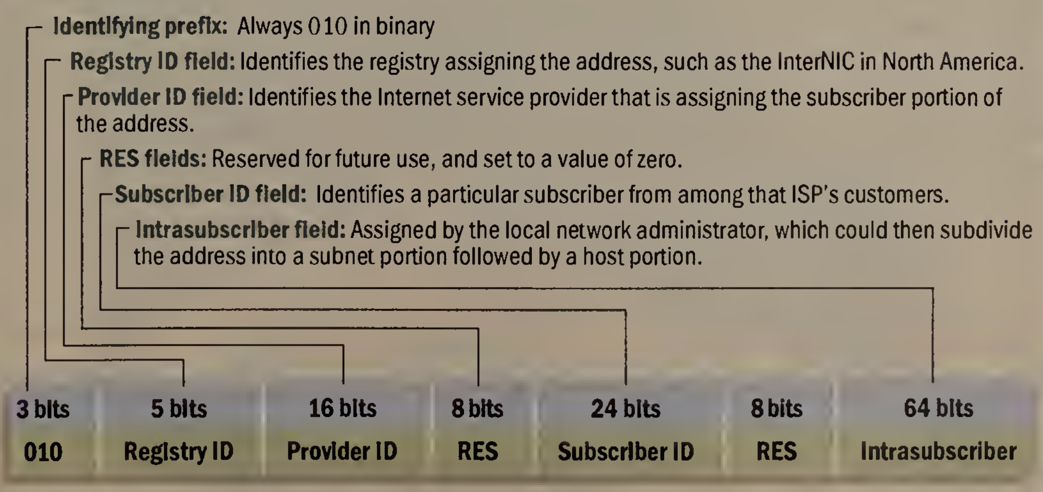
Other changes are also required, such as updates to the Routing Information Protocol and Open Shortest Path First protocol to handle the larger addresses, and changes to Domain Naming System servers to handle larger address records.

End-user applications and operating systems may likewise need revision, so they can access the features available in IPv6. One example is the extensions to the Berkeley Unix operating system currently under development.

The Berkeley application program interface, generally known as the socket interface, is used by a number of TCP/IP-based applications. This API must be revised in order to support the new features that come with IPv6, such as the priority and flow label fields within the base header.

Figure 2: IPv6 PROVIDER-BASED UNICAST ADDRESS

Addresses assigned by a central authority to end-user organizations


Identifying prefix: Always 010 in binary
Registry ID field: Identifies the registry assigning the address, such as the InterNIC in North America.
Provider ID field: Identifies the Internet service provider that is assigning the subscriber portion of the address.
RES fields: Reserved for future use, and set to a value of zero.
Subscriber ID field: Identifies a particular subscriber from among that ISP's customers.
Intrasubscriber field: Assigned by the local network administrator, which could then subdivide the address into a subnet portion followed by a host portion.
3 bits
5 bits
16 bits
8 bits
24 bits
8 bits
64 bits
010
Registry ID
Provider ID
RES
Subscriber ID
RES
Intrasubscriber

In other words, for the new features to be useful, an upper layer protocol application must have a way to access the enhanced capabilities of a lower layer. Enhancements to other operating systems, such as IBM's AIX, Novell, Inc.'s NetWare, and SunSoft, Inc.'s Solaris are also under way.

How do we sign up?

More than a dozen vendors, including key host and router vendors such as Bay Networks, Inc., Cisco Systems, Inc., Digital Equipment Corp., FTP Software, Inc., IBM, Novell and Sun Microsystems, Inc., have publicized their IPv6 plans via the IPv6 home page.

A worldwide test network, called the 6bone, is currently running in North America, Europe and Japan, allowing both vendors and network administrators to build a test IPv6 network prior to rolling it into a production environment.

Most vendors and industry analysts expect IPv6 upgrades to be widely available by mid-1997, allowing you to position your networks to take advantage of these enhancements later next year.

But you must plan a clear path for the transition. Strategies to handle those issues will be the topic of the next installment in the IPv6 series, scheduled to appear Jan. 20.

Contributing Editor Miller is president of DigiNet Corp., a Denver-based data communications engineering firm. He has written 11 books on internetwork design and analysis and this fall led a Network World Technical Seminar on IPv6. Miller can be reached via the Internet at mark@diginet.com.

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The positives of performance reviews

By Douglas Welch

Performance reviews: The mere utterance of these two words sends many managers into grumbling fits and strikes fear into most employees.

It doesn't have to be that way. Performance reviews can be an exceptional tool for rewarding workers who have done well and coaching those who need some help. The review process can also be an aid in properly documenting the actions of poor performers and supporting disciplinary action, but it should not be used merely for that purpose.

"If reviews are done well, employees know where they stand," says Mitch Krayton, president of Digital Resources, a technical consulting firm for high-end publishing businesses. "This can only be helpful. If the company culture is to condemn less-than-perfect performance, managers will always be dissatisfied because no one is perfect."

When to conduct reviews

The first step in creating a successful process is to do reviews quarterly instead of annually. The speed at which technology advances can obsolete any goals you've set for workers concerning the operation of a specific product. Technology advances can also force you to abandon projects when a more functional way of doing things comes along.

The result of all this change is that workers find themselves with new job descriptions several times each year. Also, the creation of such a high-stress environment can cause abrupt changes in productivity, job satisfaction and performance.

Poor performers need even more frequent feedback. Give these employees a clear description of the behavior that needs correcting and how they can improve. Revisit the issue in 30 to 60 days.

Conducting reviews at the end of a project is also helpful. In addition to assessing the performance of individual employees, you evaluate the entire project so everyone can learn from successes and failures.

You must be consistent. Reviews need to be completed regularly, even in the midst of the usual chaos, says Rick Gundzik, president of Pacific Residential Funding, a mortgage brokerage in Brea, Calif. "When the consistency of reviews falls, so does performance," he says.

What to review

The most important part of any review is determining whether established goals were met. This means you should have already set clear goals that you and each worker agreed on. Use the review to reevaluate those goals and adjust them as needed.

Goals must be measurable. You can establish, for example, that all net support calls must be handled within 48 hours, or that assigned projects be completed on time and adhere to predefined specifications.

There should be flexibility built into these measures, though. If interdepartmental bickering prevents someone from achieving a goal, you may not be able to hold your staffer at fault.

How to review

Just as staffers must be trained to do their jobs better, you must learn how to conduct an effective review. Here are a few specifics to get you started.

- Keep notes on good and bad behavior as it occurs. Communicate this immediately. You can write short memos of thanks for good work or improvement updates to those who need help. Also, use your notes when preparing the actual review.
- Reinforce good behavior as you remind employees of the bad. In lean times, praise may be the only thing you can give.
- Be specific. The notes you've kept should help you refer to specific events. Employees will feel more fairly treated if you provide solid examples to illustrate a point.
- Do reviews on neutral ground. Reviews are stressful enough without emphasizing the power dynamic of conducting them in a manager's office. Instead, hold reviews in a conference room or other private location. "The person giving the performance review is generally the direct supervisor, and that involves power," Krayton says. "This power can be abused, and that is where the danger comes from."
- Cooperate with employees in setting goals instead of dictating them. Forcing employees into roles they don't want or understand can lead to bad performance.
- Consider using 360-degree review methods to gather input from all the people who deal with an employee.

Most of all, you shouldn't do reviews because they are required. Rather, find something useful in the process. It is the single most important method of conveying priorities and goals to employees. If reviews are failing, it may not be the concept that is wrong, it could be the implementation.

Welch is the former director of MIS for Hollywood Online, a major Internet content provider, and is now a computer consultant and freelance writer in Van Nuys, Calif. He can be reached at dewelch@earthlink.net.

Access additional resources for improving your performance reviews.

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- **A Society for Human Resource Management article that helps you judge evaluators and provides tips on how to improve a manager's performance review skills.**
- **A 360-degree appraisal process in which you gather feedback from everyone an employee deals with inside and outside the company.**
- **A look at what Johnsonville Foods did to enable its employees to evaluate each others' performance and pay.**
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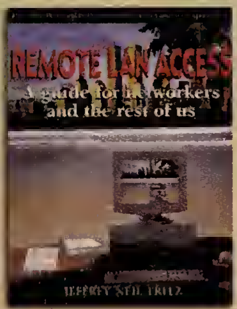
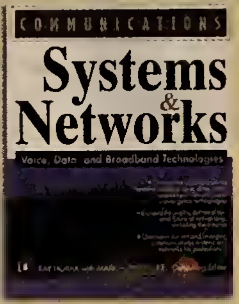
NETWORK BOOK REPORT

Remote LAN Access: Guide for Networkers and the Rest of Us
Jeffrey Fritz (Greenwich, Conn.: Manning Publications Co.), 267 pp., $34.95. Phone: (203) 629-2078; ISBN: 0-13-494451-8.



Aimed at net administrators and telecommuters alike, this book covers the evolution of remote connectivity, explores the differences among connectivity services and discusses the potential of ISDN for LAN connectivity. Information on equipment and methods, connecting to the 'Net and optimizing WAN connections is provided. It also discusses telecommuting issues and provides an appendix of remote LAN access and ISDN information sources.

Communications Systems & Networks: Voice, Data, and Broadband Technologies
Ray Horak with Mark Miller (New York: M&T Books), 486 pp., $34.95. Phone: (800) 321-9299; ISBN: 1-55851-485-6.



First in a new Networking Technologies Library series, this volume discusses communications technologies from their origin along their evolutionary paths and how they will shape business strategies into the 21st century. Voice, data, video systems and networks are set in the context of standards and regulations, and cost issues are compared and contrasted. The Internet and the Telecommunications Act of 1996 are covered in detail. Network professionals and communications professionals on all levels of management and in all types of business may find this book useful.

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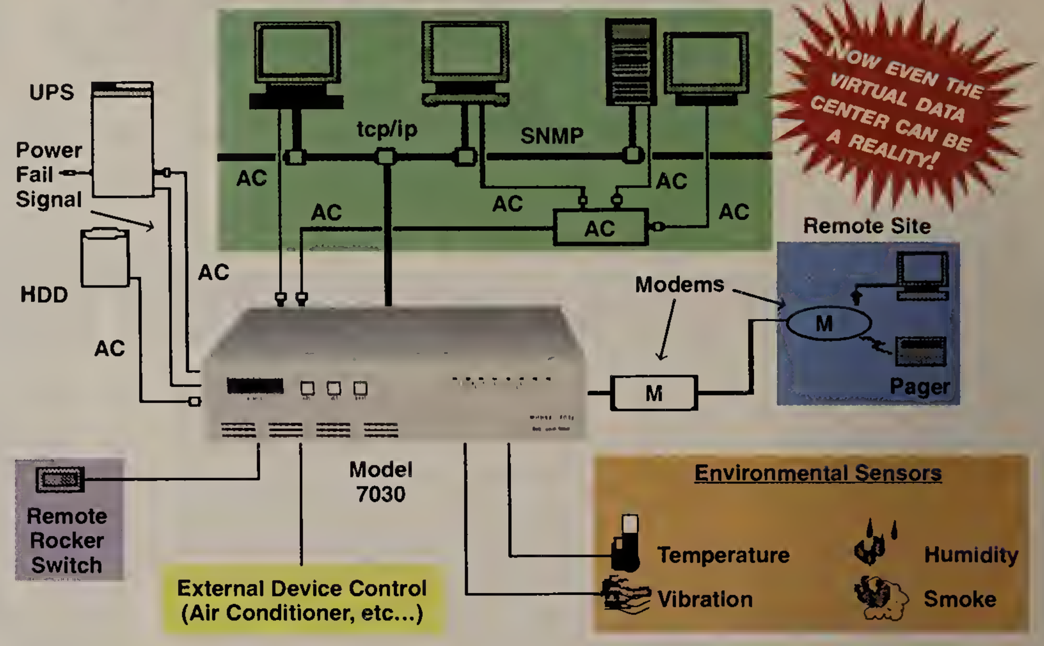

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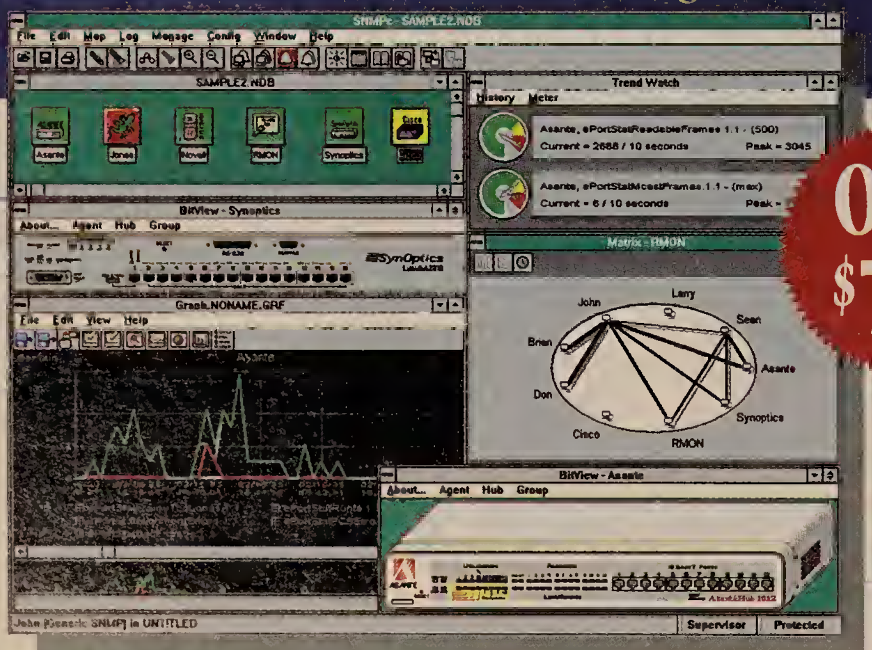

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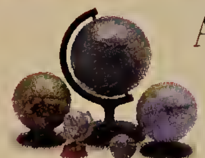

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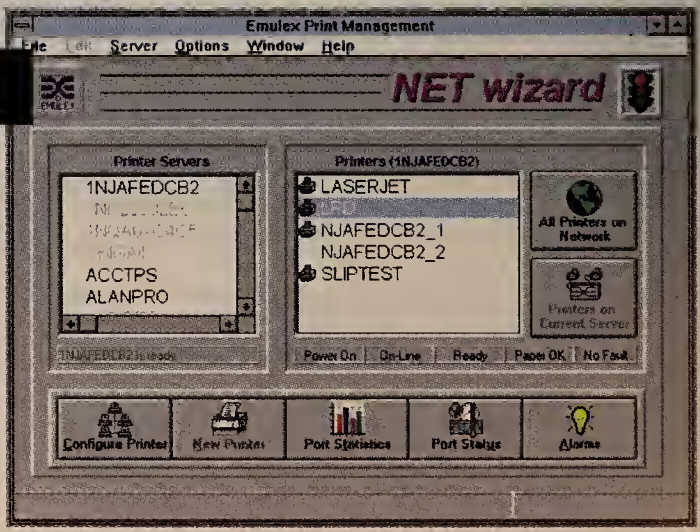

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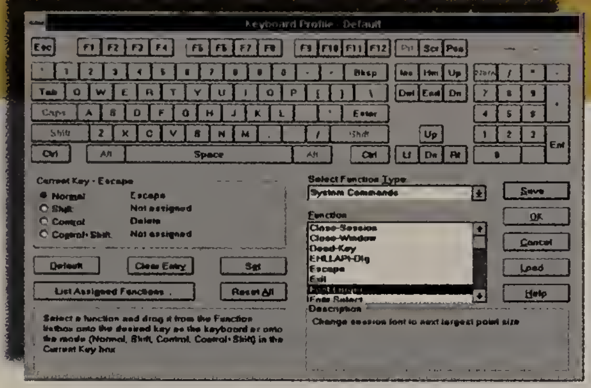

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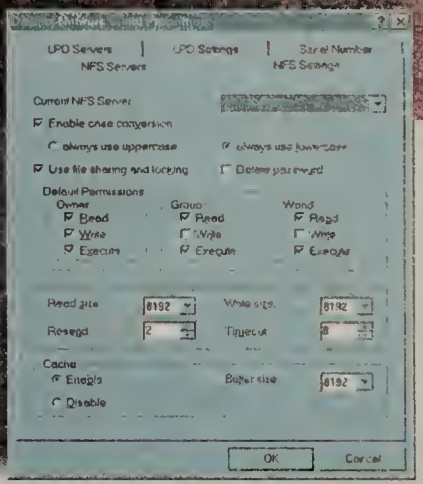

Current NFS Server

☑ Enable case conversion

○ always use uppercase ● always use lowercase

☑ Use file sharing and locking ☐ Delete password

Default Permissions

Owner: ☑ Read ☑ Write ☑ Execute

Group: ☑ Read ☐ Write ☑ Execute

World: ☑ Read ☐ Write ☑ Execute

Read size: 8192

Write size: 8192

Resend: 2

Timeout: 8

Cache: ● Enable ○ Disable

Buffer size: 8192

Highlights:

- Integrates seamlessly into Windows 95
- Mounts NFS drives from Explorer or Network Neighborhood
- Supports file and record locking
- Allows central authentication with a single server running PCNFSD for all NFS connectivity
- Prints to NFS or LPD print servers
- Allows login to all systems with a single login name and password or different login names for each system
- Allows single-operation logout of all systems accessed through Network Neighborhood
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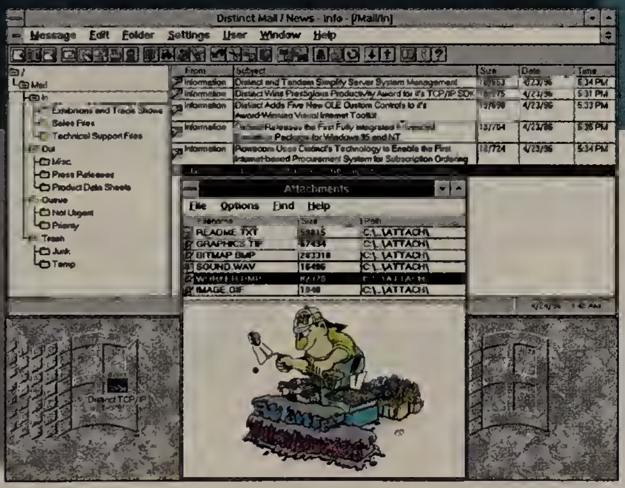

Highlights:

- Multi-connect FTP Client with Firewall Support
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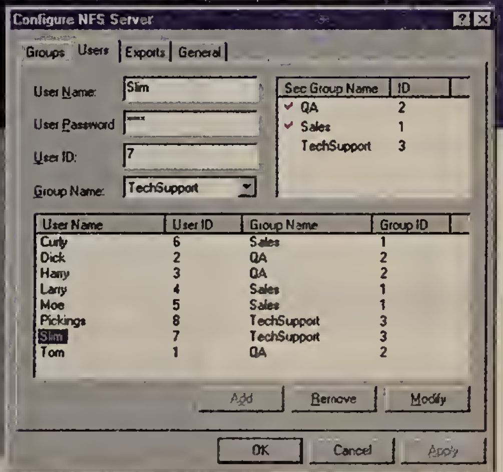

User Name: Slim

User Password: ****

User ID: 7

Group Name: TechSupport

	Sec Group Name	ID
✓	QA	2
✓	Sales	1
	TechSupport	3

User Name	User ID	Group Name	Group ID
Curly	6	Sales	1
Dick	2	QA	2
Harry	3	QA	2
Larry	4	Sales	1
Moe	5	Sales	1
Pickings	8	TechSupport	3
Slim	7	TechSupport	3
Tom	1	QA	2

Highlights:

- Includes all major TCP/IP based file and printer servers in a single package: NFS Server, FTP Server, LPD, TFTP and BOOTP.
- Integrates seamlessly into Windows 95 and Windows NT
- Password protected login for all servers
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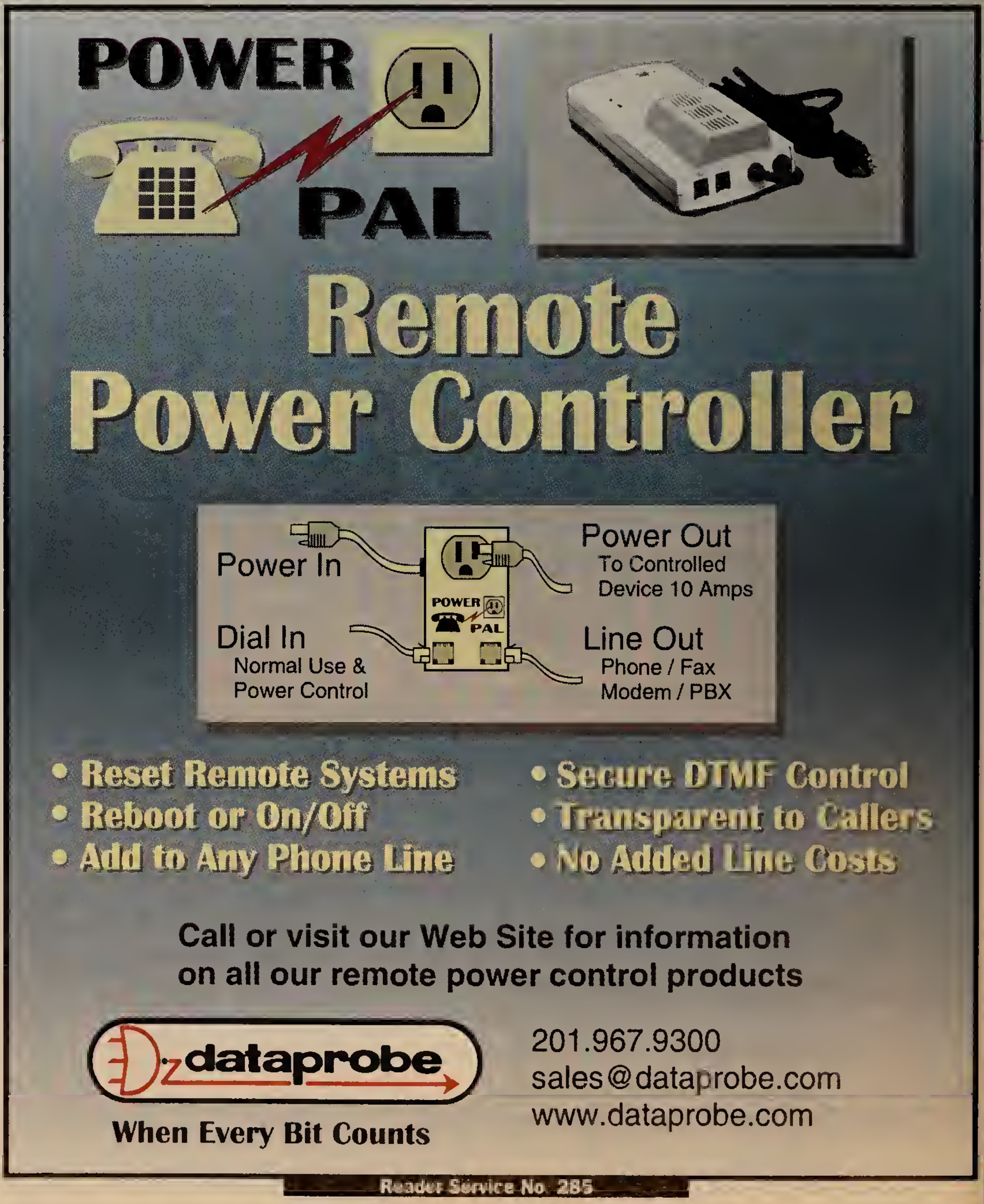

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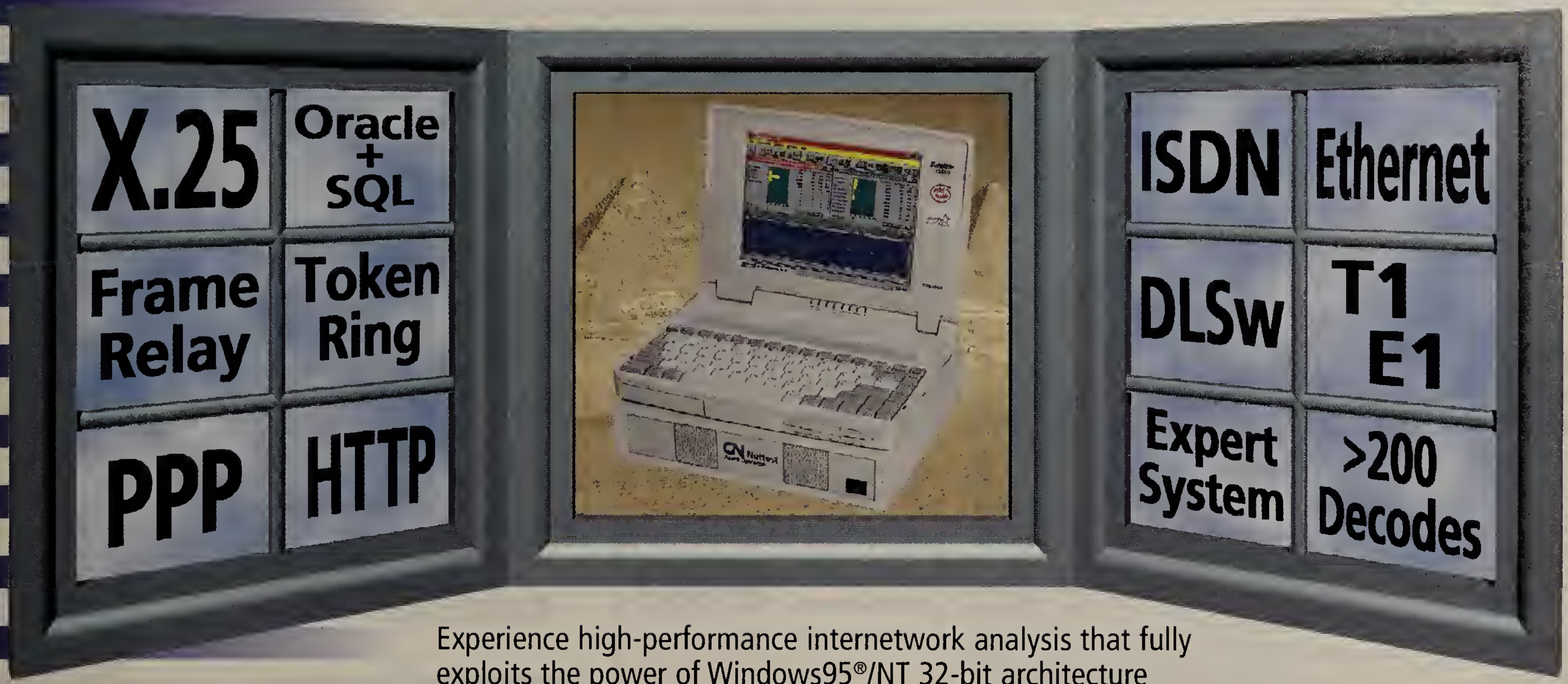

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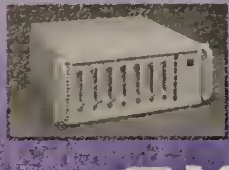

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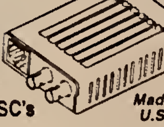

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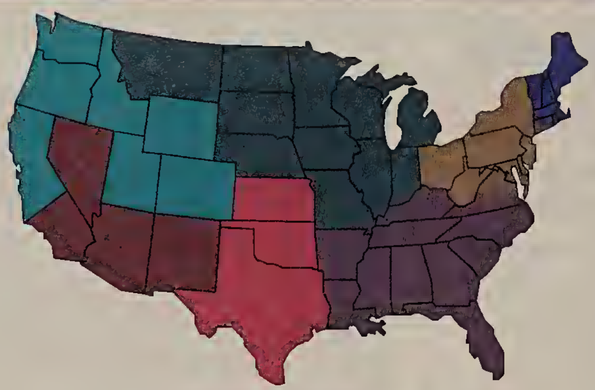

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Groupware

Continued from page 1

and an alliance of computer broadcast companies to work with Domino.Broadcast's application framework.

Whether migration to the Web is a business imperative for groupware/messaging administrators or overheated hype on the part of vendors depends on who you talk to.

"When we talked to CEOs last spring, 57% said they would be making a strategic commitment to roll out a new E-mail infrastructure within the next 12 months," said Eric Brown, an analyst with Forrester Research, Inc. in Cambridge, Mass. "People have a fistful of dollars, and they're ready to find a new partner to fix the fact that they have either old mainframe mail systems or 18 different LAN-based systems out in the field."

However, there are those customers who believe the Web sled may be ahead of Rudolph. Stephen Lopez, director of systems for the National Board of Medical Examiners, is not convinced that companies are clamoring for Web-based mail.

"For me, it's about 50-50," Lopez said. "The only reason we're pursuing it is because it's a nice, neat way to get into [GroupWise]. But I don't have to have it, and a lot of the people I deal with [as a consultant] are of the same opinion that they don't have to have it."

"People have a fistful of dollars, and they're ready to fix the fact that they have either old mainframe mail systems or 18 different LAN-based systems," Forrester's Eric Brown says.

Lopez is not alone.

"My opinion is that I'd sit back and wait," said Linton Smith of George Westin, Inc., a Toronto holding company undergoing an Exchange rollout. "The argument is that proprietary systems are going to go away, and it's all going to be Web, but each approach introduces its own wrinkles. Internally, I don't see why it's compelling because our users are used to using E-mail in the standard fashion."

The same cannot be said, however, for the state of Kentucky's 600,000 public schoolchildren. The Kentucky Education Technology System is looking to Exchange as its vehicle for E-mail.

"We are sitting back waiting for [the new Exchange] to roll out," said John Logan, network analyst for the project. "What we were concerned about was the POP3 availability so some of the schools [with older machines] can do POP mail."

Which vendors positioned themselves best this year to scratch the Web itch in 1997? While there are dissenting notions out there, it's no surprise that Lotus and Microsoft are mentioned most often, with Novell, Netscape Communications Corp., Hewlett-Packard Co. and Oracle Corp. in the mix.

"It was a game where it was Lotus and Microsoft and Novell," Brown said. "But in the 'Net, Netscape will have taken Novell's third-place position."

As for the two at the top, Lotus and Microsoft, that may not be settled any time soon.

"Well, my feeling is that it's a dead heat," Brown said. "It'll be a third and a third going to those guys, 15% to 20% to Netscape, and the rest going to others — that's how the next 18 months will shape up." ■

NT 5.0

Continued from page 1

use in large networks, and Microsoft has billed its new Active Directory as the solution. But developers said design hooks between Active Directory and the existing NT domain-based service could hold the company back from delivering a truly manageable and scalable NT Server.

Beyond the backward-compatibility issues, developers pointed out several kinks in the alpha release that could result in administrative hassles if not remedied in the final release.

Specifically, they noted:

- Problems with moving groups of users between branches of the directory tree.
- Awkward browser-based directory administration.
- Complications with deleting and renaming users due to ties between user accounts and the NT Server Security Identify.
- Physical naming schemes, which require end users to know which servers network peripherals are attached to access them.

Microsoft, however, warned developers not to draw too many conclusions from the pre-beta Active Directory code it handed out last month: The software lacks many features slated to ship with the beta code next year.

"We fully expected it to be buggy," said Jeff Price, a Windows NT Server project manager. "But the point was to get it out to developers to get their input on our general direction."

While not indicating whether these issues will be resolved, Price said features expected in later versions include a 32-bit Windows application for managing the service, the ability for the directory to store security information such as Kerberos certificates, server-to-server replication and a global catalog.

Still, a reliance on backward-compatibility with NT domains has some developers worried the new directory will inherit manageability problems.

"This Active Directory is a hack job," said one developer who requested anonymity. "They would have done their customers more justice by building a hierarchical directory from the ground up instead of working in all the naming schemes and the NT trust relationships."

Windows NT administrators have long complained about maintaining multiple trust relationships across domains. Price acknowledged the new service will employ trust relationships, but said administration of relationships is more automated.

"Backward-compatibility is a double-edged sword," said Mike Schumacher, an NT developer at Cubix Corp. in Detroit.

"But realistically, it is a requirement for Microsoft because they can't leave all existing users hanging," he said.

Microsoft has taken a practical approach to getting a directory service out the door that will be useful to its customers, said Jack Serfass, general manager of Cheyenne Software, Inc.'s Directory Management Group in West Haven, Conn. Serfass's firm makes DS Standard, a set of directory management tools for Novell Directory Services (NDS), and is working on a version for NT 5.0.

"There is a Ph.D. purest view of what a directory should look like and what it should do, and then there is the reality of constructing one that a customer can actually use and find value in," Serfass said.

Kirk Fallbacher, an engineer with Cheyenne's Directory Management Group, praised Microsoft's work in providing interoperability between Active Directory and services such as NDS and X.500.

"They have provided ways of not only getting at objects that the directories have in common, but also at extended schema objects," he said.

"Microsoft is promising a lot for application developers and administrators who have to manage [the directory]," said Jim Vanderslice, a program manager at Cognisoft Corp. in Seattle.

Noting that Active Directory will help make Cognisoft's NT Server application, Intelliserve, more flexible, Vanderslice said his main concern is time to market.

"They have to deliver an awful lot in a very short period of time," he said.

One developer, who asked not to be named, said he is concerned with maintaining the integrity of directory information with Active Directory.

While the Active Directory database can be partitioned and then distributed, NT 5.0 servers will only support a single replica of directory information per server. This becomes an issue when an administrator wants to back up the distributed partitions to one server, he said. ■

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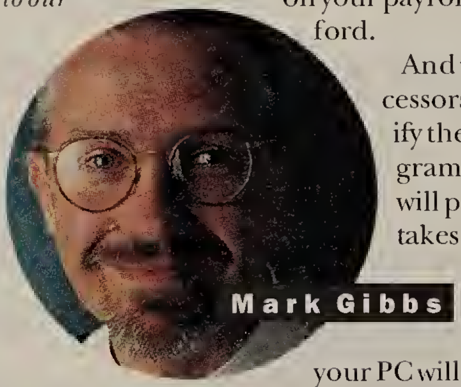
Gigahertz processors and putting on a brave (or any other) face

Before I tilt at this week's windmill, a word from our sponsors:

Interested in intranets? Find out how to join Network World*'s Intranet Business Group at http://www.gibbs.com/ibg/. And now back to our regular programming.*


Mark Gibbs

One of my biggest problems is remembering where I read something. Happens all the time. I read a stack of weekly, monthly and quarterly publications, a half-dozen electronic newsletters and what-have-you.

But keeping notes on everything is just not possible, so I have to trust my faulty memory.

For example, I have no idea where I read that in or around 1998, Intel Corp. plans to have a processor running at around a gigahertz. A gigahertz! Wow.

Now what will you do with this little speed devil? Well, let's assume that software will reach some kind of feature bloat limit before we get anywhere near a gigahertz clock speed so we don't just use up every bit of power on sloppy code. (Yeah, I know this is a pretty big leap of faith, but work with me on this.)

We'll have lots of extra cycles to burn, won't we? Hmmm. What use could this extra oomph be put to?

Well, here at the Gibbs Institute we've come up with an idea. Television is converging with computers; and the next great killer technology, video teleconferencing across the 'Net, is on the verge of being good enough to be useful.

Big prediction: Video telephony is going to be commonplace on corporate intranets within two years, and for business to business across the 'Net within the next three years.

Now, with gigahertz computers that can do slick image modification in real time, we could change the way we present ourselves to the world. We can appear however we wish to appear.

Hungover? Your computer can remove those bags under your eyes and the red wool stitching that makes you look like something out of "Zombies Ate My Flesh."

You're now fresh as a daisy.

Hell, why stop there? Take a few years off if you're heading downslope on the age hill, or add a few if you feel that you need to be taken more seriously. Whatever it takes for you to make that good impression.

Think that customer service guy is a little too ugly to be seen? Pow! Instant digital makeover — Robert Redford is now on your payroll. Or Cindy Crawford.

And with multiple processors, we could also modify the audio side. Bad grammar? The computer will patch over your mistakes. Accidentally hiccup or burp while making that big pitch — no one but you and your PC will ever know.

Of course, the computer could also watch the person you're talking to and monitor his pupil size, eye movement and voice stress. Then, by making subtle modifications to your voice and checking the other guy's response, it could determine which configuration is getting the best reception.

Of course, the guy on the other end might be doing the same thing to you at the same time. (Just imagine the computers at either end getting into a real-time adaptive morphing battle.)

Video teleconferencing across the 'Net is on the verge of being good enough to be useful.

The possibilities are endless and, of course, you can see what's coming after that: We'd just remove the humans and let the computers do all the work. We'd just get reports of how our virtual conversations went, and the age of people talking to each other will be over.

There would be a lot less stress because we wouldn't be continuously interrupted, and we'd all get much more work done. Now if I can just get a computer to somehow remember what I read, life will become damn near perfect.

For now, I'm only on text at mgibbs@gibbs.com and audio at (800) 622-1108, Ext. 504.

Video calling offers new vista of control, right from your PC

It is hard to imagine a trade or business publication *not* brimming with stories about the Internet. The topic is hot, but a big reason for the story glut is that journalists finally have a technology they believe they understand. Each uses the Web; ergo, each is a seasoned expert.

In the spirit of "since everybody's doing it, so can I," I'm pleased to share my opinion about my new area of expertise: desktop videoconferencing.

In a perverse way, video calling's popularity will rise because it appeals to the urge to control.

I predict video calling over intranets and the Internet will be big. I'm dubious about its alleged potential for saving travel money, but it's a terrific way to enhance business and personal relationships. Seeing folks is more satisfying than hearing them or reading correspondence.

Video calling has trade-offs. You can get high-quality video and audio for about $1,500 per seat. Or you can get fair quality for less than $400. Quality requires bandwidth. LAN-based video calls are fine, but fuzzy, broken images will plague callers over slow-speed links.

In a perverse way, video calling's popularity will rise because it appeals to the urge to control. For many, computers are the preferred method of controlling business operations and relationships. Flowcharts control business processes. Spreadsheets steer money management. Some people answer E-mail before voice mail.

Desktop video calling is the next level of such control. Now you can interact with the world without leaving your PC. No more time-draining trips to the conference room or distant cities. Worldly success is based on image management. Video calling lets you manipulate images of people to your heart's content.

The CU-SeeMe software I've been using from White Pine Software, Inc. lets me view a caller in real time, freeze the image, change colors or, best of all, minimize the person into a start button.

The software also lets you measure packet flow for each video call. Now you can quantify verbosity.

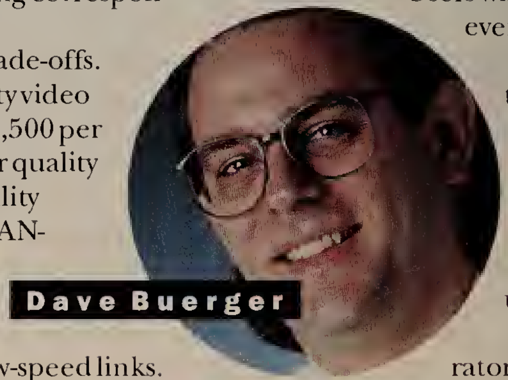
Video calling is not painless. There are protocols to follow. Callers need to dress for data compression, which means shunning stripes, checks and white shirts against white walls. Violate this rule and your image will shimmer like Liberace.

Video calls also can be an intrusion. Imagine the simultaneous advent of a video call, a telephone call and your boss's secretary demanding an immediate visit to the Big Guy — all while orchestrating a "take your daughter to work" day. And the video caller sees it all.

I video-talked using CU-SeeMe locally over an Ethernet and over the Internet via a 128K bit/sec ISDN link. The software was bundled with a Winnov camera and Videum video card for just $399.

The video was fair to good. Internet frame transmission rates averaged five per second; LAN rates averaged 10 to 15 per second. By comparison, television runs at 27 frames per second.

Price and quality make this a good time to try the products. The experience will help you prepare for the inevitable. Users will like video calling even if you do not.


Dave Buerger

On a personal note, this is my last regular opinion column for *Network World*. Good writing is hard; creating a compelling read entails much unsung help.

My primary collaborator is my wife and business partner, Maggie. She scrutinizes most of my writing for publication. Over the years, her judgment and phrasing skills often saved my neck.

Network World's copy editors should also take a bow. Their profound mastery of English reminds me of how much I goofed off during English classes.

I grudgingly appreciate the counsel of other editors, especially John Dix, who loved to send me scurrying back to the keyboard to answer innocent comments like, "I don't get it." (Translation: Rewrite this crap before I spike the copy!)

Finally, I thank you readers who endured my biased rants and cynicism. I meant almost every word I wrote and made up the rest. Good luck and happy networking.

Buerger is a networking industry consultant and writer in Atlanta. He can be reached at dave@buerger.com.

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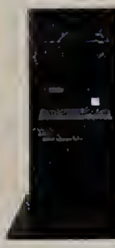

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